PREMIER ISSUE

GARBAGE

The Practical Journal for the Environment

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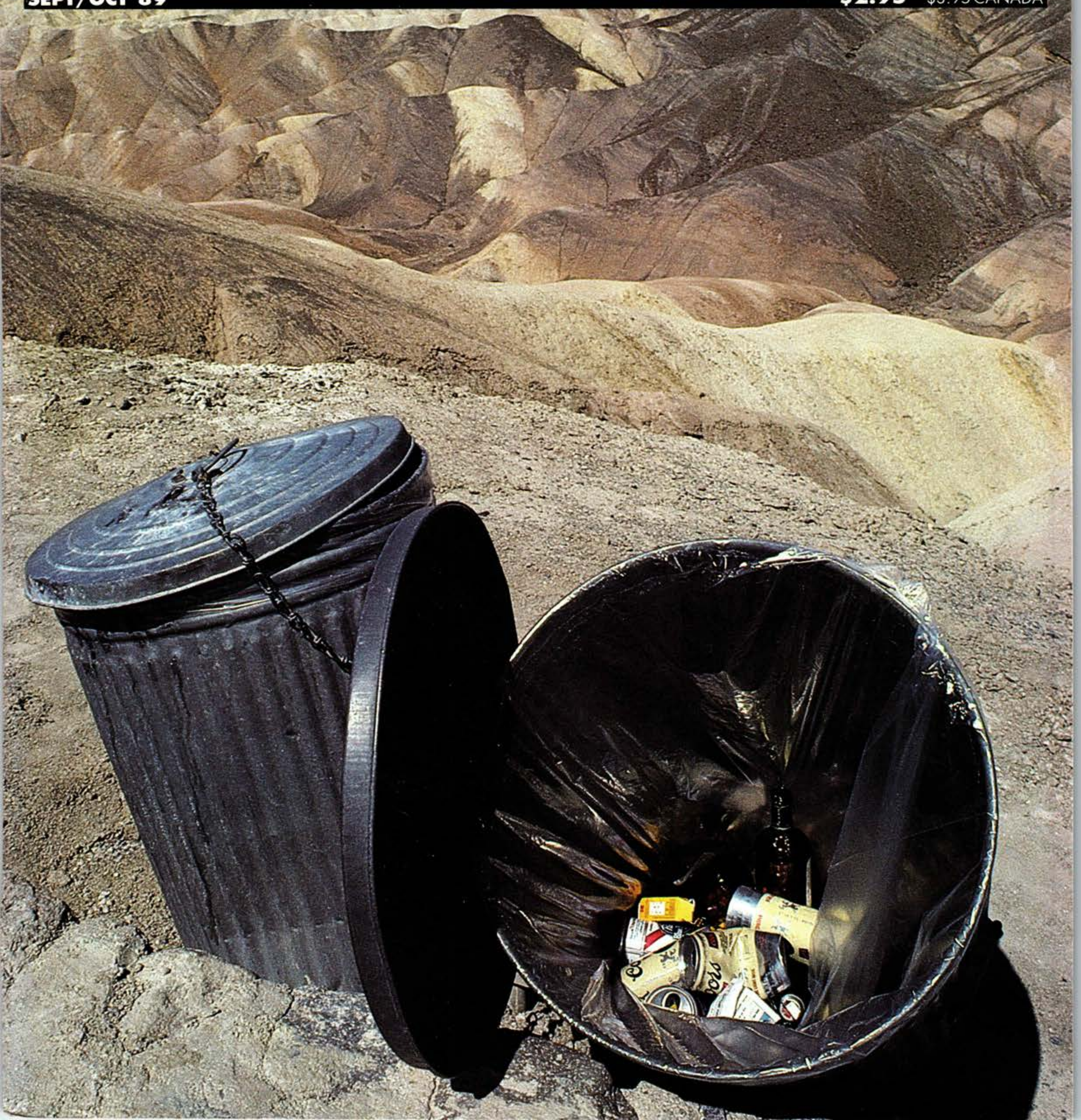

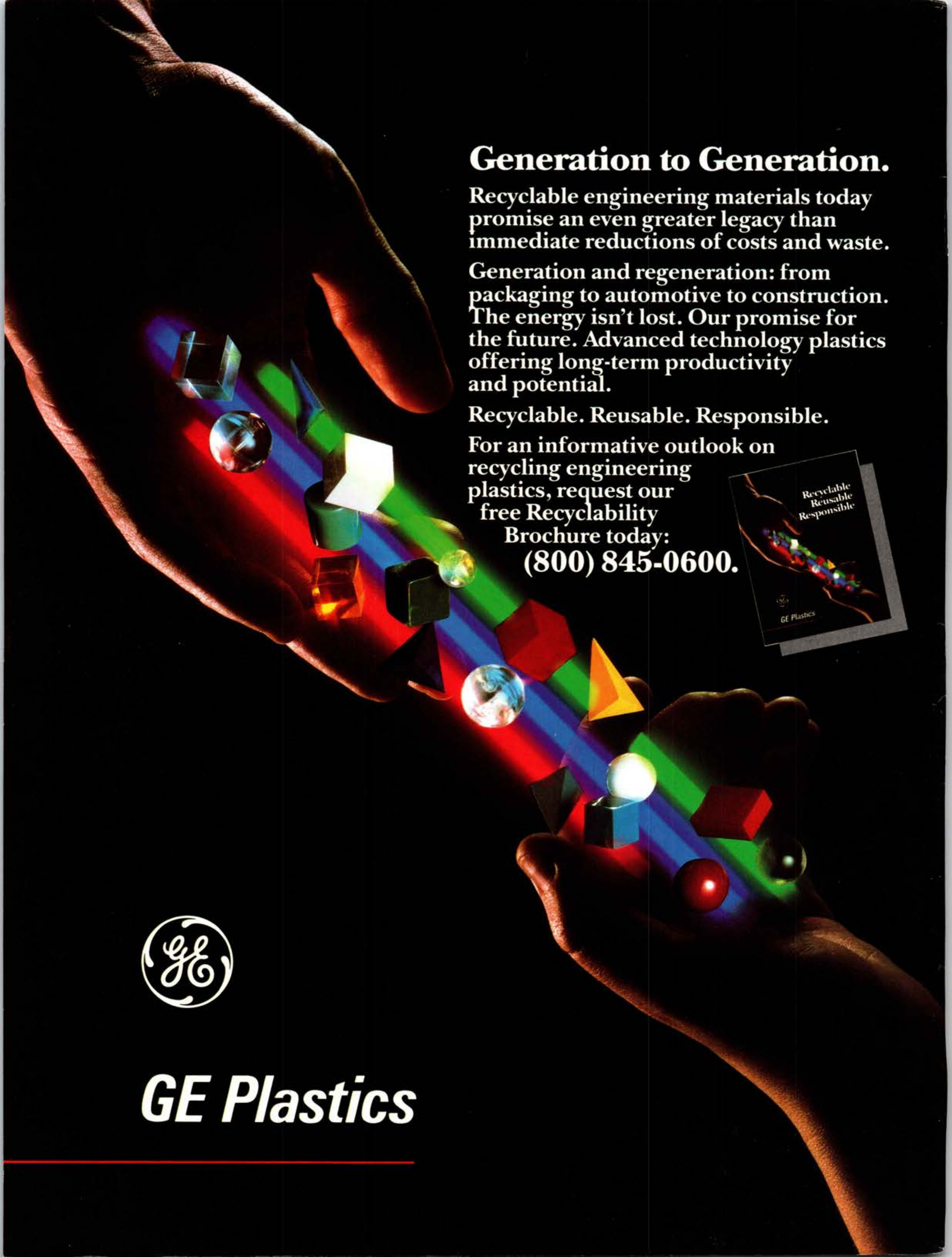

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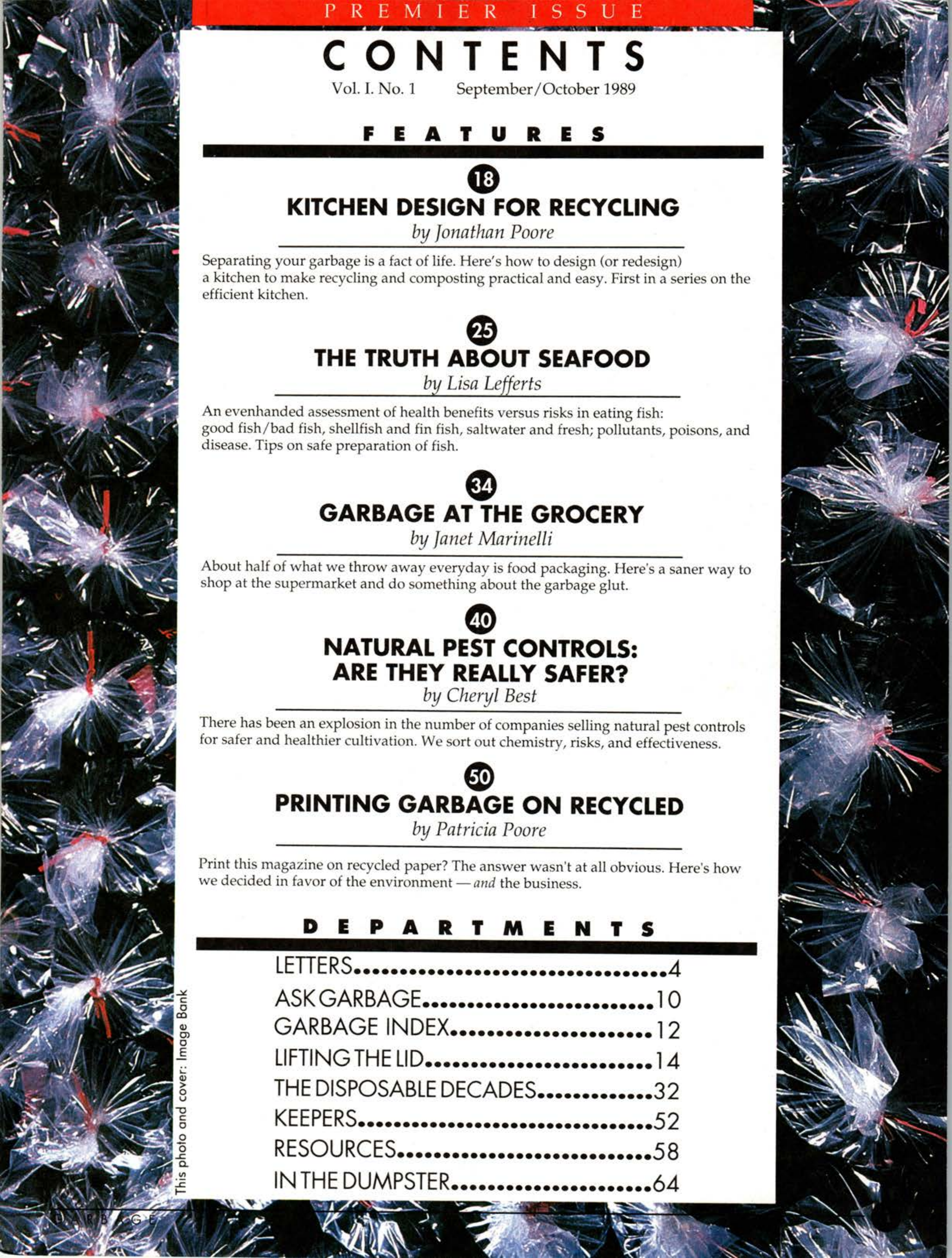

PREMIER ISSUE

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This photo and cover: Image Bank

FROM THE EDITOR

This magazine is unlike any other environmental magazine you'll ever see. It's independent. It's practical. It's got a sense of humor. It's written as much for people who never leave the city as for wilderness backpackers. We all live on the same planet.

People ask me why I started this magazine. Very simply, it's because *I* want to read it. I love beautiful nature photography, but it doesn't tell me what I need to know. What is all this plastic I'm lugging home from the supermarket? Can I really compost in my tiny backyard? Is fish still safe to eat?

I want explanations that go beyond sensational headlines. I want both sides of the story — not only an industry viewpoint, but not only an environmentalist viewpoint, either. I searched for a magazine that was more about people than about wildlife, and that didn't assume I was a rural homesteader. I wanted some help figuring out what I can do, day to day, that would make a difference.

That's why I started this magazine.

In each issue, you'll find useful departments like "Keepers" (p. 52) and blunt ones like "In the Dumpster" (p. 64). You'll also find:

- an article that's roll-up-your-sleeves practical — information you can put into practice;
- a look at the environmental science behind the news and the choices we face as individuals and together;
- a food and health article that sorts out everyday risks with an eye toward which risks are acceptable and which are not;
- a gardening article with practical advice on how to restore health to our own ecosystems (our backyards);
- a look at how we got into this mess — and some lifestyle changes that could lead the way out.

The next question people ask me is why I named it **GARBAGE**. The magazine named itself! When the staff was gearing up for this new project, we found ourselves referring to it as "the garbage magazine." I guess that was easier to say than "the environmental magazine" — and more to the point. We knew our magazine would, at its core, be about waste: wasteful habits, solid waste, waste of resources, hazardous waste, waste that shouldn't be waste, waste that pollutes and enters the food chain.... In other words, garbage.

We stuck with the obvious name.

There's a more subtle meaning behind the name, too. Early on, we read a thought-provoking editorial in a major newspaper that said solving our garbage crisis was going to require a change in attitude. Not likely for us greedy Americans, the writer sniffed. I had an immediate reaction: "What *garbage*!"

Attitudes *can so* change. A change in attitude after the second world war — one fostered by economists and marketing genius — is partly to blame for the garbage crisis we have today. (See the centerfold.) I've seen many attitudes change in my own lifetime. Think about smoking in public. Think about our collective attitudes about women in society . . . or *glasnost*. Think of how your own assumptions and habits have changed in the course of your life.

When it comes to safeguarding our environment, I truly believe Americans are ready for a change in attitude. We know quite well that we're fouling our own nest. We're tired of inferior consumer goods; the growing demand for quality is also a rejection of throwaway products. We want to get off the consume-it/trash-it treadmill.

How to begin? With individual choice — you do what you can do — and I promise that **GARBAGE** will provide do-able tips and tools. I hope, too, that we'll offer a dose of common sense and perspective. And I hope **GARBAGE** will be one signpost on that path to a new attitude.

Thank you so much for picking us up.

Patricia Poore

In the next issue of
GARBAGE

The Diaper Debate

Composting in Small Yards

Organic Foods: Are You Getting What You Pay For?

How to Cut Home Energy Use

Clean Fuels/Clean Cars

GARBAGE
The Practical Journal for the Environment

VOL. I **NO. 1**

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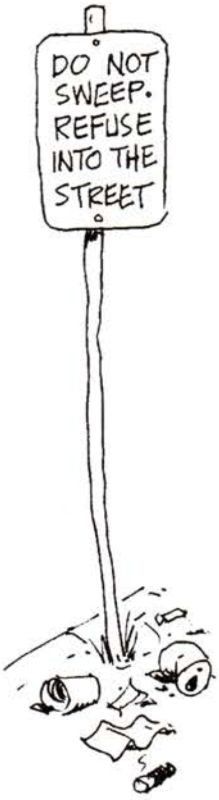
LETTERS

No pun intended, I think the time is ripe for a magazine called **GARBAGE**. I congratulate you on your courage to "tell it like it is" and to name it likewise.

Although I am a writer, illustrator and cartoonist by profession ("There Oughta be a Law!", United Features Syndicate, 13 years), I did get involved in local politics a few years back and got myself elected Councilman on the Town Board of East Hampton, N.Y. For four years, I served as Chairman of the Town Dumps committee as well as the Parks, Beaches, Harbors, and Waters committees. Over that period, I became intimately acquainted with garbage, rubbish, litter, pollution, and all the other ills that beset our environment. Thus I have had experience on both sides of the fence: as a critic and complainer, and as one who has had a crack at trying to do something about it.



I applaud your approach to these often controversial issues, especially your use of humor to lighten what could be an unpleasant, unattractive subject.

Oh. The sketch to the left is of a sign I used to see in New York City. Somebody had added a period after "sweep," and I was always confused as to how one went about "refusing" into the street. Thank you for not getting so fancy that you'd name your magazine *Refuse* instead of **GARBAGE.**

Frank Borth
Montauk, N.Y.

I have been composting for many years, never put chemical fertilizer in my garden, and I recycle, recycle, recycle.

My questions for you:

Is your magazine made of nonrecyclable paper?

Does your magazine contain glossy pages?

Are toxic inks used to color anything at all in your magazine?

If you can answer NO to all of the above questions, I will consider a subscription. Are you gutsy enough to respond to this letter? I wonder!!

Elizabeth Holl
St. Louis Park, Minn.

I spill my guts on p. 50. And, in answer to your questions, no, no, no. — P. Poore

As I watched my hand stroke out the characters G-A-R-B-A-G-E on my check, I couldn't help but think, "What am I doing? I'm writing a check for a magazine that doesn't exist yet and it's called **GARBAGE**!" I must be some kind of fool. But I feel the need for your type of journal is worth the risk.

I would pose one very important question to you: What measures are you taking to ensure that your product is environmentally sound?

I expect you to address this in your first few issues; it would help convince me and others that you practice what you preach.

Kelly Klepinger
Westminster, Calif.

My wife and I are almost-charter subscribers to *Old-House Journal*. Your mixture of inspirational pieces and nitty-gritty practical information, the depth and breadth of your coverage of important issues, the degree of give-and-take with your readers, your regular information about needed sources and resources, and your unfailing sense of humor — this combination seems to me unique in any field.

Regarding **GARBAGE**: My wife and I have long been concerned with environmental issues, composting our leaves and garbage, supporting Massachusetts' bottle bill, and striving to minimize our waste in general. I became involved in more-than-personal environmental action only last fall, when our town formed a trash advisory committee. As a member of this group, I have learned vastly more about solid-waste collection and disposal and the practical issues in recycling and composting than I would ever have imagined was worth knowing. As a result of our work, Chelmsford has adopted a curbside collection program for recyclables and compostable yard waste. Our next challenge is to get the rest of the citizens as excited about the program as we are, so that we get maximum participation.

Assuming that you bring to **GARBAGE** the same breadth, depth, and quality of coverage that have made *OHJ* famous, it will surely become an invaluable resource as we work to extend and refine this program. Please accept my best wishes and encouragement in this worthwhile endeavor.

Michael P. Anthony
Chelmsford, Mass.

I, of course, have no idea who your marketing people are, but you ought to fire the lot of them for even suggesting such a ludicrous name for a magazine. I would never buy it.

Unsigned
Northern Virginia

Could've been worse! Garbage is only part of the problem, as noted in the book review on p. 58. — the editors

When I read your [direct-mail] letter, I thought I heard myself talking to myself. You reproduce my own thoughts, so beautifully and exactly!

I have been a charter member of several publications in recent and not-so-recent years, but I can't think of another subject in which I'm more interested at this moment than yours: Garbage!

Good luck in this venture. I imagine you are young people, and I applaud your energy and commitment to saving our world. I am nearing the end of my life, grateful that I lived in a time that was less polluted, less hectic, less cynical and worldly.

Sometimes I would like to be younger and taking up the sword to do battle against so much environmental carnage.

Well, again, good luck!

Ann Middleton
Albany, Calif.

I decided to risk it and enter my subscription to **GARBAGE.**

I've waited a long time for a journal like this! Over the years, I have modified

Some companies talk about the environment. At Coors, we've done something about it. We've taken a leadership role in the industry.

We know that when a person walks through a forest he changes it, just with his footprints. We also know there are some natural resources which can never be replaced once they are consumed or lost. That's why Coors has devoted so much time, and so many resources, to programs that can help protect our environment.

We feel a responsibility to do more than just encourage conservation. We want to act. That's why we pioneered the recyclable aluminum can.

Part of the American dream is an abundant and clean environment for this and future generations to enjoy. Coors is proud to be getting together with you to protect that dream.

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my product choices and habits so much that where our two-person household used to pitch three full cans a week, we now put out 1/3 of a single can a week. And this was *without* the support of any municipal recycling program! So I know from first-hand experience how much a person can accomplish just in their own little daily sphere, with their daily habits. What has frustrated me is the paralysis of people around me because they're so sure they can't possibly make a dent. They're not lazy — they've been frightened to the point of giving up. Your new publication sounds like just the kick in the pants many would need to realize their power to effect real change.

Marcia Butchart
Westford, Mass.

I just read of your new publication in the "Magazine" column of the *L.A. Times*. It sounds like a well-timed concept, given the significantly larger number of Americans who are just realizing they need to know more about key environmental issues. A non-affiliated publication such as yours, written in a clear, down-to-earth way and addressing people's real questions, could really catch on.

Robin J. Dunitz
Los Angeles, Calif.

I read how you were saying you wanted to be objective about subjects, and that is good. Keep in mind that if you contact any governmental agencies or industry people, you will not receive an objective story, because they are paid to have their view. Ask citizens who take time from their jobs and families to get the real story.

Good luck with the magazine.

Gary Wonderlin
Allied Citizens Opposing Pollution
Pennsauken, N.J.

You cannot imagine how excited I was when I read in the *Wall Street Journal* about your new magazine. This "practical journal" is exactly what I have been waiting for. As a consumer, I feel that the best way to protect oneself is by being informed; unfortunately, that often takes more time than I have. This magazine will bring together many areas that I am concerned about, and ways I might contribute to alleviate these growing problems.

I wish you success, and be assured that I will pass along the news about this wonderful new publication.

Stacey Brooks
Boston, Mass.

Congratulations on your new magazine. If I were somewhat younger than my 80 years, I would be after the job of editor of **GARBAGE.** As editor of *Machinery* and *Wire Journal*, I wrote a bundle of articles on industrial pollution about 25-30 years ago, when EPA was just starting.

Laurence W. Collins, Jr.
North Branford, Conn.

Hooray for **GARBAGE**! Two days before I read about your publication, we were notified that our neighborhood, Colonial Place, had been chosen (with one other neighborhood in Norfolk) to participate in a one-year pilot program for recycling. We fill our bin with newspapers, glass jars, plastic bottles, and cans, and a special truck picks it up weekly. We were chosen in part because we are [old-house] renovators. The neighborhood is 80 years old, and most of the houses are pre-1930.

GARBAGE will help us so much, and I look forward to reading your first issue. The *Old-House Journal* has been our best tool.

Margaret MacConochie Bright
Gary Bright
Norfolk, Va.

I work at Lawrence Berkeley Laboratory (run by the University of California for the Department of Energy) in Berkeley, California, where I study building energy efficiency and do some work on global climate change. I am trying to change to the study of garbage instead; I see a lot of similarities, as well as important differences, between energy efficiency and waste minimization. I am particularly interested in source reduction and reuse; I think these get less attention than recycling, despite the fact that they are better than recycling. Recycling gets more attention because it is much easier to quantify, measure, and make money on (or at least break even on).

I heard someone refer to styrofoam popcorn/peanuts as "ghost droppings." Doesn't that have a nice ring to it?

You might consider always putting the word "disposable" in quotes, since very few of these items actually go away. One product that is truly disposable are tea cups on the Indian Railroad; they are apparently made from clay and meant to be used only once. When you are done, you simply toss the cup out the window (presuming you aren't in the station), and the clay melts back into the soil it came from.

I look forward to receiving my first issue — it sounds like you will have fun making it.

Bruce Nordman
Berkeley, Calif.

Thanks so much for all the wonderful goodies in *Old-House Journal*. Our home is patiently awaiting the application of techniques we read about.

How appropriate that we send to (Brooklyn) New York for **GARBAGE** — we've been getting it free for years! Looking forward to the first issue.

Rebecca Tarditi-Sferra
Beach Haven, N.J.

Ms. Tarditi-Sferra is referring to decades-old accusations that fly between the two states, the latest of which concern the source of that garbage washing up on Jersey beaches. — the editors

Just a note to say I enjoy *Old-House Journal* tremendously. I like it best for the technical, in-depth articles. Those are hard to find elsewhere, especially as well written and easy to read as yours are.

I wish you luck with **GARBAGE.** I hope to show it to other people to convince them that conservationist living can be easy. Will you include ads for manually operated appliances (juicers, can openers, slicer/dicer/shredders, etc.) and diaper services?

Robin Soergel
Denver, Colo.

We're keeping an eye out for finely crafted — and energy-saving — hand tools and appliances to feature in "Keepers," our products section. Turn to page 52 for information on degradable diapers and diaper services. — the editors

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Thank you, thank you, thank you. I have been looking for a magazine like this for a long time.

Lynn Landry
Andover, Mass.

A fellow teacher at my high school was offered a Special Charter Reservation Form and showed me the information regarding your new magazine **GARBAGE**. I love it! What a catchy title!

I am designing an environmental biology course to teach at Enfield High School, Enfield, Connecticut, and the articles will be more than appropriate for class discussion.

I also serve as a network link in Western Massachusetts, filtering information between various local environmental groups and National Toxics Campaign, Massachusetts Public Interest Research Group, Executive Office of Environmental Affairs, Department of Environmental Quality Engineering, Attorney General's Office, Clean Water Action and, occasionally, Greenpeace.

Our local group Citizens For A Quality Environment has been successful in defeating a trash-burning plant and is presently involved in local and state recycling efforts.

As a biologist, I am seriously concerned about biomagnification, bioconcentration, or as the experts say, "base-loading."

If your magazine proves as exciting as I suspect, I will alert my network.

Brace yourselves — you may get more than you bargained for!

Kenneth R. St. George
Chicopee, Mass.

Very few people will want to spend much time reading about garbage! Certainly not those who understand anything about our subconcious [sic] mind.

Therefore, would you please consider changing the title to something a little more positive — *Fresh Air ... Fresh Water* — or something we'd like to have around our homes? Who wants to spend time pawing through garbage? At least we don't here. Your project is important, so how about giving it all the help you can? I don't think you'd name your child Ugly. We'll skip your subscription offer.

Now to something better. Please send me some information about your *other* magazine on fixing old houses. Many thanks — and good luck with your new goal (and new title).

J.R. Milmoe
San Jose, Calif.

I'm *so* glad you are going to put out this new magazine, **GARBAGE**. These issues you are going to address are very important to me (to many of us), and I often need help on *how* to implement recycling/environmental action in my own life. As well as the *straight* facts on what's happening and what we can collectively do about it.

A big hand for you all!

June Busby
Busby's Plumbing
Everett, Wash.

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Lois Gibbs, Executive Director — Citizen's Clearinghouse for Hazardous Wastes

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ASK GARBAGE

Q: *I've seen people use checks and credit cards inscribed with the logos of various environmental groups. Is this just a way to get exposure, or do these checks and credit cards generate money for the organizations?*

Sarah Moore
San Francisco, California

A: Checks and credit cards pass through a lot of hands, so those bearing the name or symbol of a particular organization *do* increase a group's visibility. They may even recruit new members. But the main point of these checks and cards is to help fund the causes they endorse.

The checks you've been seeing are the product of Message!Check, the only nationally based service to feature endorsements for activist groups on checks. The two environmental groups Message!Check sponsors are Greenpeace and the National Audubon Society. Checks are sold in packages of 200, for $14; every time you purchase a set, $1 goes to the group you've selected to back. Message!Check has given nine to ten percent of its gross revenue to the worthy organizations it endorses. The company plans to contribute approximately $125,000 to Greenpeace, for example, over the next three years.

For more information, write Message!Check Corporation, P.O. Box 3206, Dept. GM, Seattle, WA 98114.

Cause-related credit cards help nonprofits a bit differently. Approximately 2,000 groups, from local Elks Clubs to national organizations, have their names brandished on credit cards. Donation policies differ from group to group. For instance, the Environmental Defense Fund, a national lobbying and litigation group, has an arrangement with Visa/MasterCard: EDF receives one-half of the annual card fee (the first-year fee is waived) and 0.75% of each purchase a cardholder makes. EDF receives about $20 to $30 per cardholder the first year, and from $40 to $100 a year per account after that. Accepted applicants receive both a Visa and a MasterCard under one line of credit. Contact the main office of the group you'd like to support to see if that group has a credit-card program.

A credit card from the Working Assets Funding Service of San Francisco, on the other hand, generates funding for a roster of activist groups. Each year, Working Assets cardholders vote on the organizations they'd like to support, then determine collectively how much each group will get. Last year, 32 groups were funded; eight were environmental groups. The San Francisco-based Rainforest Action Network, which works with international environmental and human rights organizations to protect tropical forests and indigenous peoples, received $14,000 – more than any other organization. Working Assets sets aside $2 for every new account and five cents each time a cardholder makes a purchase with his or her card. Call 1-800-52-APPLY for more information.

Q: *I've recently started using natural pest controls in my garden, but I still have some leftover chemical pesticides stored in my garage. How can I get rid of them safely? Are there basic rules to follow when disposing of any toxic household product?*

Grant Rosendahl
Knierim, Iowa

A: Although federal law requires pesticide manufacturers to explain disposal procedures on labels, the guidelines provided are not always the safest. Many manufacturers suggest that consumers wrap pesticide containers in a few layers of newspaper, then throw them into the trash. But this means they'll end up in an ordinary landfill, and the toxic pesticides can leach into water supplies.

The best way to get rid of unused pesticides, paints, solvents, motor oil, and other toxic household substances is to take them to a waste site on a designated drop-off day. There, they wil be isolated and disposed of safely, usually through incineration. Twenty-seven municipality- or industry-sponsored monthly drop-off programs exist in the U.S. right now, but the numbers are expected to grow. If your community does not sponsor a household hazardous-waste disposal program, urge your local officials to set one up. In the meantime, try to minimize your use of hazardous products.

GOT A QUESTION?

Write to: Questions Editor
GARBAGE
435 Ninth Street
Brooklyn, NY 11215

A candid discussion about household hazardous waste

Whether or not we like to admit it, each of our homes probably contains numerous household hazardous waste items. In fact, it is estimated that the average household contains between ten and fifteen gallons of hazardous waste materials.

The potential dangers of carelessly storing and discarding household hazardous wastes are no secret. In an effort to prevent these wastes from finding their way into local sanitary landfills and water sources, many concerned citizen groups and city leaders are aggressively seeking ways to organize household hazardous waste collection programs.

GSX Chemical Services, Inc., is one of the nation's largest organizations committed to the effective management of household hazardous wastes. We create responsible community partnerships to educate people about the dangers of household waste. GSX has helped to organize, and has participated in, nearly two hundred hazardous waste collection programs across the country. GSX can help solve your household hazardous waste problem.

If your community is considering organizing a collection program, we encourage you to contact GSX at 1-800-845-1019. Our manager of household hazardous waste is available to answer your questions about conducting a waste collection program in your area.

GSX

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During the 1970s, we worked closely with the U.S. Environmental Protection Agency to produce an information program to help city sanitation managers better understand disposal options.

Since the mid-1980s, we have built on our partnership with Keep America Beautiful, Inc. to sponsor local clean-ups nationwide. The "GLAD Bag-A-Thon® Program," a public/private sector effort, has now grown to 69 cities. In 1989, 318,000 participants bagged 16 million pounds of litter. They collected and bagged an additional two million pounds of recyclables, including plastics.

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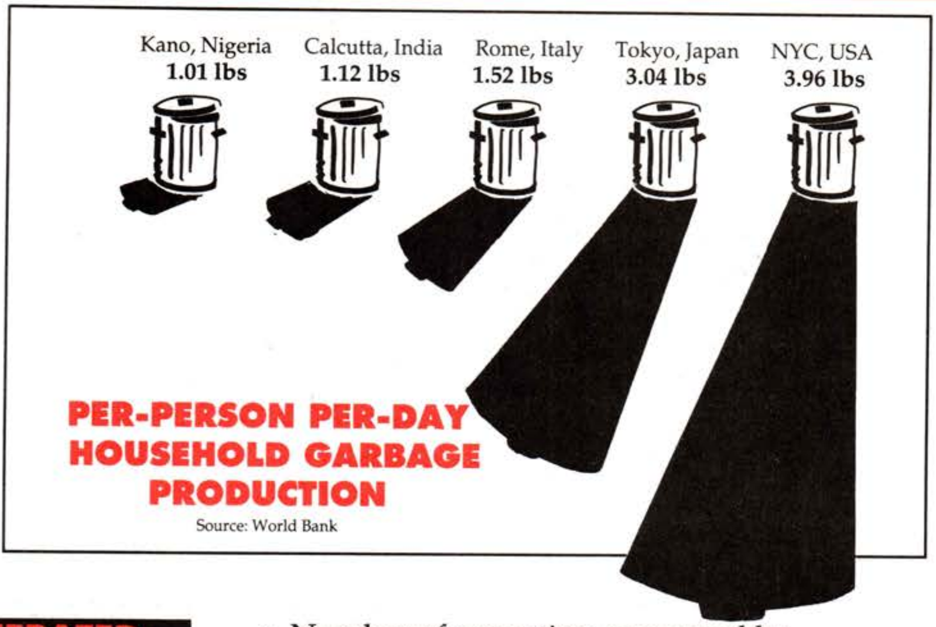
GARBAGE INDEX

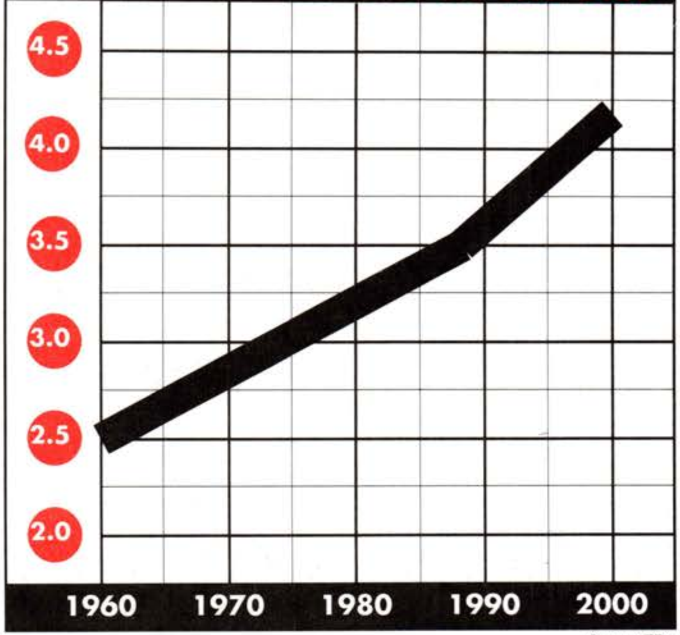
THE THROW-AWAY SOCIETY LIVES



PER-PERSON PER-DAY HOUSEHOLD GARBAGE PRODUCTION

Source: World Bank

POUNDS OF TRASH GENERATED PER PERSON PER DAY IN THE U.S.



Source: EPA

Largest single component of solid waste in landfills:
Newspapers – 14% (by volume)

Total newsprint and percent of recycled newsprint used per year by:

- The New York Times – 450,000 metric tons (5-10% printed on recycled)
- The Los Angeles Times – 417,000 metric tons (83% on recycled)
- The Washington Post – 280,000 metric tons (0% on recycled)
- The Wall Street Journal – 220,000 metric tons (1.4% on recycled)

Source: Garbage staff research

- Number of scrap tires generated by American drivers in 1988 – **246.9 million**

Source: EPA

- Number of razors & blades Americans throw away each year – **2 billion**

Source: EPA

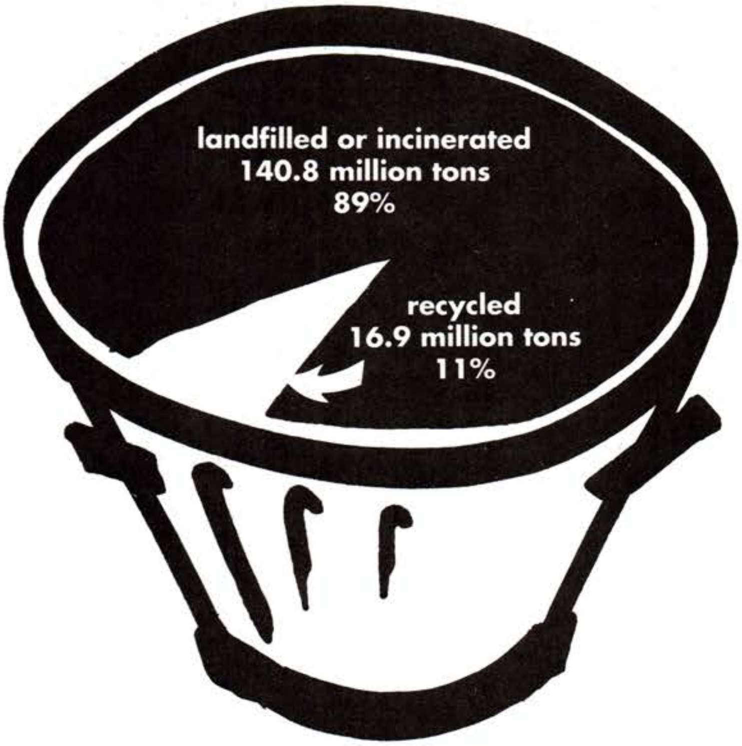
- Number of pens thrown away – **1.6 billion**

Source: EPA

- Cubic centimeters of liposuctioned human fat disposed of by American plastic surgeons in 1986 – **27 million**

Source: Computation from American Society of Plastic Surgeons figures

HOW AMERICA DISPOSES OF ITS TRASH



Source: Franklin Associates; 1986

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By Newsday
Winner of the Worth Bingham Award

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We have run out of space to bury the 250 million tons of garbage that Americans produce each year. How can we cope with the abundance of trash that is quickly swallowing our land and polluting our air? In **RUSH TO BURN**, *Newsday* reporters explore the origins of America's garbage and investigates the pitfalls of incineration: the quick and very dirty method of waste disposal used by desperate communities across the nation. This important book focuses on critical issues faced by government officials, planners, and citizens everywhere, and ends by presenting workable solutions for keeping trash under control and out of the air.

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FOR THE RECORD

"It's sweet and it doesn't have any of that stuff they spray on the apples."

George Bush
on why he drinks carrot juice
(*Newsweek*, 3/27/89)

"Say it over and over for a number of years."

Cooper Evans,
special agricultural assistant to President Bush, on how to persuade the American public that our food supply is safe from pesticides and tampering
(*The New York Times*, 4/26/89)

"Now people can come here and watch a Vikings game and stay for the weekend. It's a different world when you have a megamall."

Kurt Laughinghouse,
mayor of Bloomington, Minnesota,
on the city's planned 4.2 million-square-foot Mall of America,
featuring 18 movie theaters, eight department stores, 600-800 specialty shops,
three hotels, an amusement park, parking for 12,750 cars, nightclubs, and restaurants
(*Newsweek*, 6/19/89, and *Garbage* staff research)

MISLEADING LABELS

Don't be fooled by the recycling symbols on plastic containers at the supermarket. They're part of a plastic-container coding system that was designed and is being pushed by the Society of the Plastics Industry (SPI). It's being opposed by recycling advocates and state recycling officials.

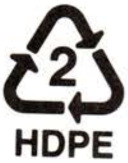
The purpose of a coding system that labels containers by plastic (resin) type is to help in sorting and recycling. The SPI code is a variation on the traditional "chasing-arrow" symbol used on paper and other recycled products. SPI's chasing arrows form a triangle; a number in the center and letters underneath indicate the resin from which the container is made. For example, 2 is HDPE (high-density polyethylene), used for packages from milk containers to grocery bags (see illustrations below, right).

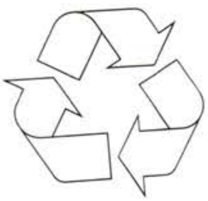
Those opposed to the SPI code cite two major reasons: One, its similarity to the traditional recycling symbol leads consumers to believe there is a workable recycling infrastructure for all plastics, when only polyethylene terephthalate (PET), used mostly for beverage bottles, is being reclaimed in any quantity (20 percent last year). Two, the SPI recommends that manufacturers label the "predominant" resin in the package. In other words, if the package is only 40 percent HDPE, it can be labelled as HDPE, as long as no other plastic is present in greater quantity. But this defeats the purpose of the coding system, as most recycling technologies require that plastics be segregated according to resin.

While a few states have adopted the SPI code, it's being fought in other states. Last year, recycling officials from the Northeast issued a statement opposing the coding system. As we went to press, Connecticut was in the process of promulgating regulations that would both prohibit the chasing-arrow symbol on plastic containers and require that any plastic package bearing a resin label contain no more than two percent of any other resin.

— *Janet Marinelli*

One of SPI's symbols





The traditional recycling symbol

MISLEADING GREETING CARDS

If you think you're buying recycled paper when you buy a card by Recycled Paper Products, Inc., chances are you're wrong.

The Chicago-based manufacturer of greeting cards prints its company name on the back of all its cards, leading shoppers to believe that the paper used is recycled. But the Coalition for Recyclable Waste has found that only the cards marked "Printed on 100% Recycled Paper" actually are. The number of such cards, which are printed on uncoated paper (as opposed to shiny, coated stock), never exceeds 50 percent of the company's inventory in a given store, and is generally closer to 10 percent.

The Coalition for Recyclable Waste, a national recycling advocacy group headquartered in New Jersey, is leading a vigorous letter-writing campaign against RPP. Its goal is to get the company to use recycled paper in *all* of its products.

Michael Keiser, part-owner of RPP, claims the company could not find enough coated recycled paper, but is now searching for a supplier. RPP, he says, is also planning to mark all its cards "Printed on Partially Recycled Paper" to account for the fact that not all its cards are on recycled stock. The Coalition is opposed to the use of this phrase, as consumers will never know whether the cards they're buying are printed on recycled paper.

— *Amelia Burgess*

TOXIC EMISSIONS

Ever wonder whether the industrial facilities in your area are emitting substances that are dangerous to human health? Three major studies released this year can help you find out.

Earlier this summer, the U.S. Environmental Protection Agency made public the first national survey of toxins released into the environment by industry. The results: 18 billion pounds of poisons were emitted directly into the nation's air, water, land, and underground wells in 1987. The written report breaks down information by state and by pollutant. In addition, the EPA is making available to the public, via a new computer database, toxic-release data on specific chemical-manufacturing facilities.

In March, the EPA issued a report specifically on toxic air emissions. According to the agency, manufacturing facilities collectively emitted 2.4 billion pounds of toxic air pollutants in 1987 — that's 10 pounds of toxic material per American, though in reality people living near industrial plants are by far the most exposed.

Sixty of the 320 chemicals covered by the national survey are listed by the government as cancer-causing, and others are known to cause neurological damage and birth defects.

The problem is even more severe than the report indicates, since only 19,000 of the 30,000 industrial facilities that were required to supply toxin inventories to the EPA by July 1, 1988, submitted them. And EPA officials said the situation could be *far* worse because the survey did not include pollution from companies that produce less than 75,000 pounds of toxic substances a year, or from automobile exhaust, or from releases at toxic-waste dumps.

Texas, the petroleum-industry capital, ranked much higher in total emissions than any other state. (See below.)

Also in March, the National Wildlife Federation, the country's largest conservation group, issued its own report on toxic air emissions based on the information submitted to the EPA. In addition to the raw data broken down by facility, by chemical, and by state, this study includes appendices on the known health and environmental effects of the chemicals, state and federal contacts for those who want additional information, and suggestions on how the national Clean Air Act should be strengthened to compel companies to reduce their toxic air emissions.

For information on the air-toxin inventory and how to use the new toxic-emission computer database, call a special EPA hotline, (800) 535-0202; (202) 479-2449 in Washington, D.C. For a copy of the National Wildlife Federation report, entitled "Danger Downwind," write the Environmental Quality Division, National Wildlife Federation, 1400 16th Street, NW, Washington, D.C. 20036.

—Ginia Bellafante

Here's how the states rank in total toxic air emissions (measured in millions of pounds).

1.	Texas	239.0
2.	Ohio	172.7
3.	Louisiana	138.3
4.	Tennessee	135.0
5.	Virginia	132.4
6.	Michigan	116.4
7.	Indiana	112.9
8.	Illinois	99.2
9.	Alabama	98.3
10.	North Carolina	94.6
11.	Georgia	93.6
12.	New York	89.4
13.	Pennsylvania	87.5
14.	California	82.7
15.	Utah	77.3
16.	South Carolina	64.2
17.	Mississippi	57.3
18.	Arkansas	54.6
19.	Kentucky	51.7
20.	Missouri	50.6
21.	Florida	50.2
22.	Wisconsin	48.7
23.	Minnesota	42.1
24.	New Jersey	42.0
25.	Washington	40.6
26.	Iowa	39.2
27.	Oklahoma	36.4
28.	West Virginia	35.6
29.	Alaska	31.7
30.	Massachusetts	30.1
31.	Connecticut	26.1
32.	Kansas	24.7
33.	Oregon	20.9
34.	Maryland	20.2
35.	Arizona	16.6
36.	Maine	14.6
37.	Nebraska	14.4
38.	New Hampshire	13.0
39.	Colorado	11.0
40.	Delaware	8.0
41.	Rhode Island	5.9
42.	Montana	5.3
43.	Idaho	4.2
44.	New Mexico	3.6
45.	Wyoming	3.2
46.	South Dakota	2.4
47.	Vermont	1.4
48.	Hawaii	1.1
49.	North Dakota	0.9
50.	Nevada	0.7

WHO'S IN TROUBLE

Union Carbide

Union Carbide's corporate name is irrevocably linked to the tragedy in Bhopal. Unfortunately, the company has since done little to exonerate itself.

On December 3, 1984, the highly poisonous gas methyl isocyanate escaped from a Union Carbide pesticide plant in Bhopal, India, leaving more than 3,400 dead and 200,000 injured. Although the Indian government originally sued the corporation for more than $3 billion in reparations, it agreed to accept $470 million from Union Carbide in an out-of-court settlement last February. The money is supposed to be distributed to the victims. However, several victims' groups and public-interest lawyers have appealed to the Indian Supreme Court to reopen the case; many of those appealing are requesting that Union Carbide provide an additional $3.5 billion to cover medical expenses.

Four-and-a-half years after the accident, the *Wall Street Journal* reported, only 777 of the victims had been compensated. The typical settlement: a lump sum of $200.

U.S. Department of Energy/ Rockwell International

The Department of Energy calculates that it will cost taxpayers $100 billion to clean up hazardous and radioactive waste at 16 nuclear-weapons plants the department oversees.

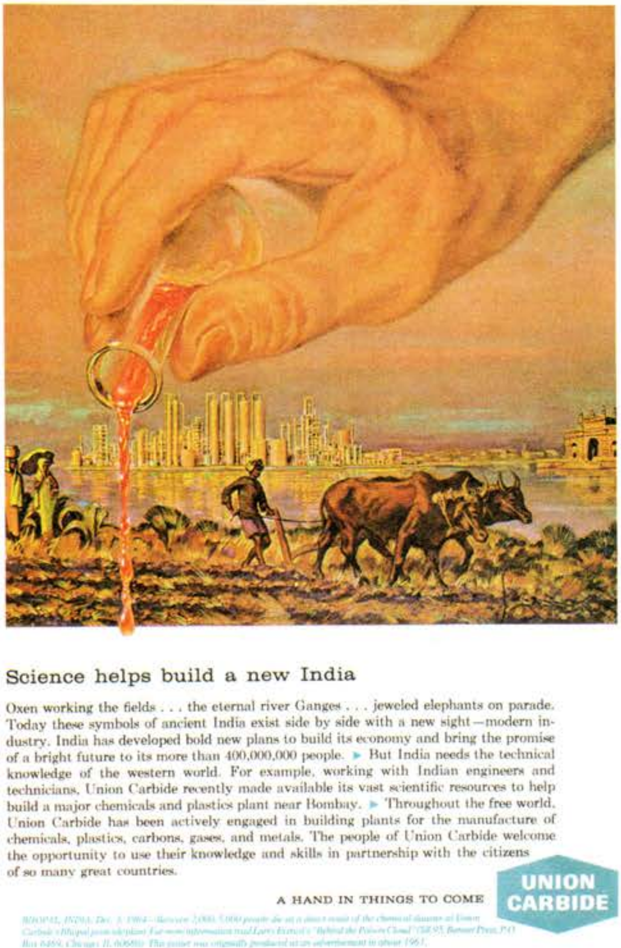
The Rocky Flats plant in Colorado has one of the worst environmental records. The Sierra Club is suing both the Department of Energy and Rockwell International Corporation, contracted by the DOE to manage the plant, for burning hazardous and radioactive waste together in an unlicensed incinerator. Rockwell is also suspected of illegally discharging pollutants into a nearby stream that is a source of drinking water for the town of Broomfield, Colorado. Meanwhile, the U.S. Department of Justice is conducting a criminal investigation to see whether government and Rockwell employees faked documents regarding compliance with clean air and water laws. And after obtaining reports from the Department of Energy under the Freedom of Information Act, the *Denver Post* reported last month that at least nine Rocky Flats workers were exposed to radiation in seven accidents between 1981 and 1987. At least three of the workers were exposed to "high levels of radiation" from plutonium oxide, according to the DOE documents.

Exxon

To say the Exxon Valdez oil spill in Alaska's Prince William Sound made a lot of people angry is the understatement of the year. Below is a sampling of some of the measures being taken by various groups to make sure Exxon and the U.S. government pay:

- The area's commercial fishing industry, tour- and charter-boat owners, landowners, and native villagers have filed a class action suit against Exxon. The largest fish processors are filing independent suits.
- Under the auspices of the Sierra Club Legal Defense Fund, environmental groups sent a series of three notices to the Exxon Corporation, the EPA, the Coast Guard, and other government agencies, informing them of intent to file suit on the grounds that the oil spill violated the Solid Waste Disposal Act, the Clean Water Act, and wildlife-protection statutes. A Sierra Club Legal Defense Fund suit, against any or all of those who received notices, will among other things demand more money for cleaning up the spill. Prior to the spill, the National Wildlife Federation had already filed suit against the Department of Interior for not promulgating strict regulations to prevent wildlife-endangering accidents such as the spill from occuring.

— Bruno R. Tedeschi



Science helps build a new India

Oxen working the fields . . . the eternal river Ganges . . . jeweled elephants on parade. Today these symbols of ancient India exist side by side with a new sight—modern industry. India has developed bold new plans to build its economy and bring the promise of a bright future to its more than 400,000,000 people. ▸ But India needs the technical knowledge of the western world. For example, working with Indian engineers and technicians, Union Carbide recently made available its vast scientific resources to help build a major chemicals and plastics plant near Bombay. ▸ Throughout the free world, Union Carbide has been actively engaged in building plants for the manufacture of chemicals, plastics, carbons, gases, and metals. The people of Union Carbide welcome the opportunity to use their knowledge and skills in partnership with the citizens of so many great countries.

A HAND IN THINGS TO COME

BHOPAL, INDIA, Dec. 3, 1984—Between 2,000–5,000 people die as a direct result of the chemical disaster at Union Carbide's Bhopal pesticide plant. For more information read Larry Everest's "Behind the Poison Cloud" ($8.95, Banner Press, P.O. Box [illegible], Chicago, IL [illegible]). This poster was originally produced as an advertisement in about 1961.

GARBAGE DICTIONARY

black mayonnaise, *noun*, toxic sludge found on the bottoms of harbors, bays, and oceans, often extending for miles, consisting of undecayed sediment, sewage, and petrochemical wastes. Word watchers at *The Atlantic* traced the term back as far as 1978. In the August 1, 1988 issue of *Newsweek* it appeared in the following context: "What is happening underwater...is not for the squeamish. Scuba divers talk of swimming through clouds of toilet paper and half-dissolved feces, of bay bottoms covered by a...sediment...appropriately known as black mayonnaise."

ALAR AND APPLES

If the U.S. Environmental Protection Agency's recent pronouncements on the safety of Alar on apples have left you confused, you're not alone.

The EPA has suspected since 1985 that Alar, a chemical ripening agent used primarily on red apples, causes cancer. In February, the agency proposed a ban on Alar when preliminary tests conducted by Uniroyal, the manufacturer, indicated the chemical poses a cancer risk 50 times greater than generally accepted levels.

In late February, scientists at the Natural Resources Defense Council, an environmental group, released a report which claimed that UDMH, a breakdown product of Alar, poses a cancer risk to pre-schoolers 240 times greater than the risk considered acceptable by the EPA. The report identified UDMH as the most potent carcinogen analyzed in 27 commonly consumed foods. In the wake of NRDC's report, the EPA issued a joint statement with the federal Food and Drug Administration declaring that the consumption of apples and apple products posed "no imminent hazard" to America's chidren. The EPA added that only five percent of the U.S. apple crop is sprayed with Alar.

In May came an article in *Consumer Reports* on results of Alar-detection tests the magazine performed on 31 brands of apple juice and 20 apples, all purchased at New York metropolitan area supermarkets. *Consumer Reports* was disturbed by the fact that seven of the juices and 11 of the apples contained traces of Alar. In June, the EPA announced that *five to 15* percent of the apple crop is sprayed with Alar. By then, many Americans had given up on apples; sales of the fruit had dropped substantially since the first reports in February.

Uniroyal has since voluntarily agreed to halt the sale of Alar for food use and to recall Alar products already purchased by farmers. But that still leaves Alar-treated apples and apple products on supermarket shelves. Those wishing to avoid traces of Alar can stick with apples labelled "certified organic." If you live in the New York metropolitan region, another option is to avoid juices found by *Consumer Reports* to be most tainted with Alar, including Hudson Pride, Waldbaum's, Pathmark, and Pathmark Natural.

The Uniroyal halt will remain in effect until final carcinogenicity tests by the company are completed in early 1990, at which time the EPA will decide whether or not to ban Alar for good.

— Ginia Bellafante

PROFILE

Making a Reel Difference

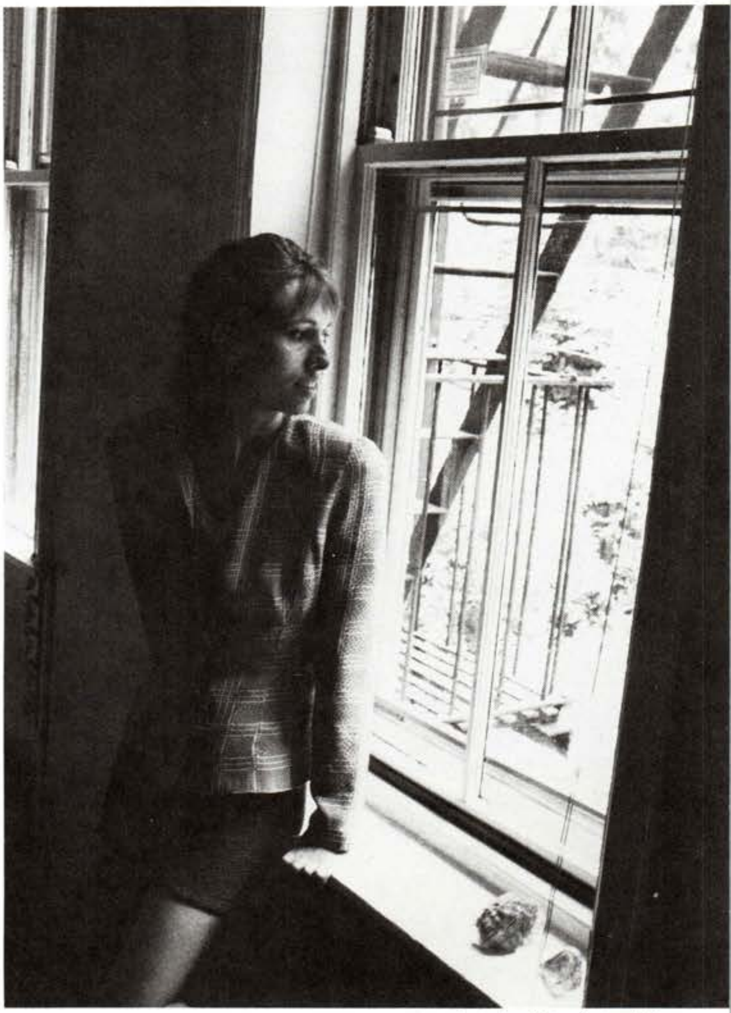


photo by Peter Seterdahl

Earlier this year, Meryl Streep spoke out against the dangers of pesticides, pop music icons rocked to save rainforests, and international movie companies battled over the rights to the life story of a Brazilian rubber tapper and deforestation opponent murdered by cattle ranchers in 1988.

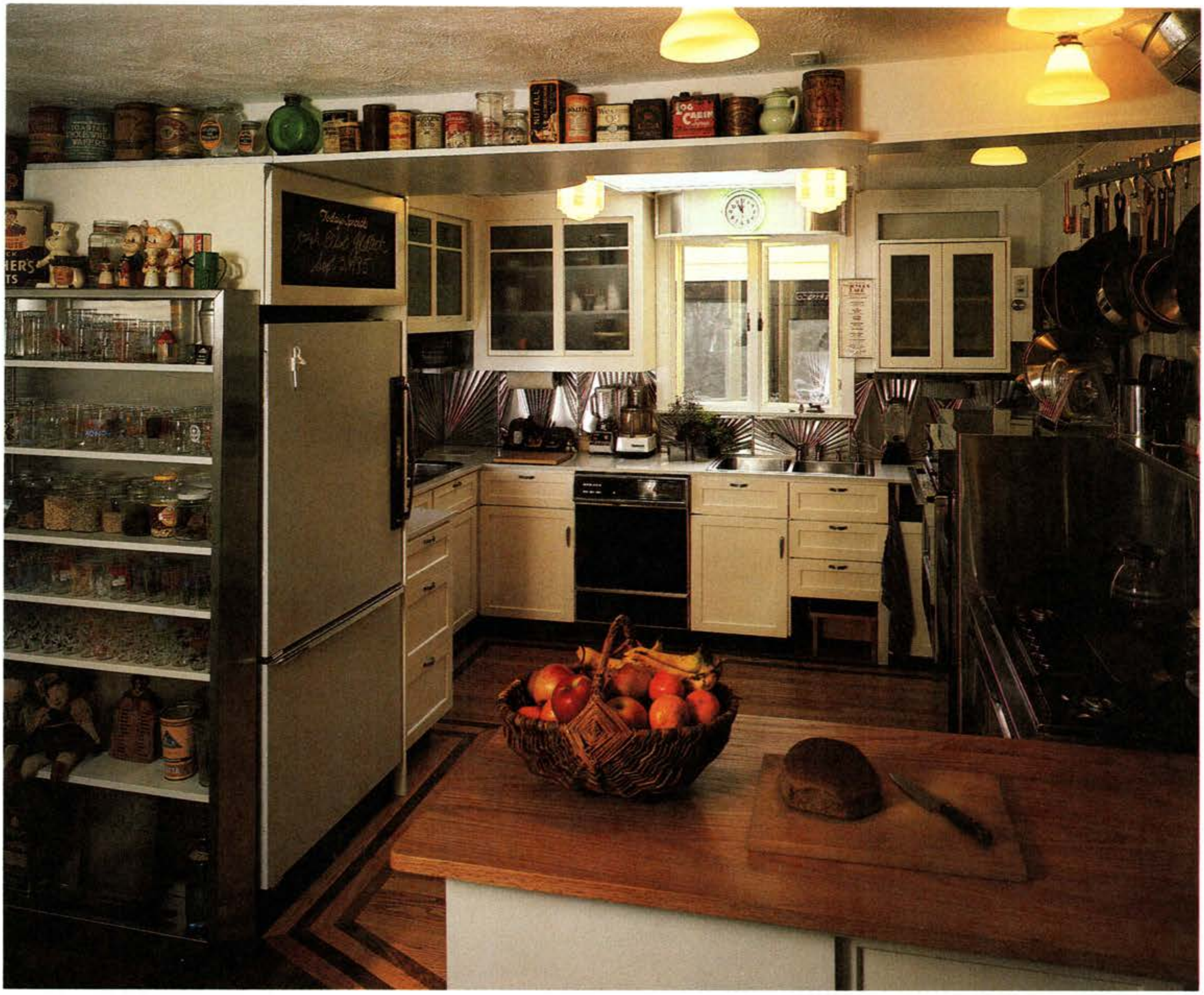
Meanwhile, miles away from glitzy Hollywood benefits, a low-profile, documentary filmmaker began production on the first independent feature film to examine the difficult choices we face in trying to solve the problem of toxic wastes. New York-based Meg Switzgable, writer/producer/director of *Passing thru Linden*, is a self-taught expert on chemical pollution. In 1978, her father was diagnosed as having bladder cancer, a condition he believed was caused by the vats of toxins an adjacent oil company stored near his garage-door factory; a number of his employees developed bladder cancer as well. The film, Switzgable says, will "look closely at how the careless dumping of hazardous waste affects lives on a very personal level."

Switzgable is staunchily committed to retaining complete creative control of the film. Rather than sell her script to a huge production company, she and co-producer Thomas Brown went through the arduous process of financing the $7 million budget on their own. Money has come from foundations and private investors, and Sony, Apple Computer, Federal Express, and several other corporations have donated over $250,000 in services and equipment. Executives at major studios have demonstrated an interest in distributing the film. HBO has expressed interest in the home video and television rights.

Switzgable's success in generating support for *Passing thru Linden* comes as no surprise to those familiar with her previous work. *In Our Water*, her 1983 documentary that aired on PBS's "Frontline" and CBS's "60 Minutes," received widespread critical acclaim, Academy and Emmy award nominations, and a Columbia/duPont award for journalistic excellence. Without a trace of melodrama, the film follows a South Brunswick, New Jersey, man's four-year struggle to close a toxic landfill near his home that had turned his tap water into the chemical equivalent of cleaning fluid.

Switzgable wants *Passing thru Linden* to reach a much larger audience than a documentary ever could. Since the EPA now numbers at 1,163 the hazardous waste sites that pose a serious threat to public health, her film is an extremely timely one. Look for it next summer.

— Ginia Bellafante



A kitchen for people who love to cook — and compost — in the home of David and Nikki Goldbeck

photo by Robert Perron

KITCHEN DESIGN FOR RECYCLING

by Jonathan Poore

Not quite three years ago, I did what every householder does at one time or another: I remodeled my kitchen. The designer (and one author of the article that follows) was my husband, an architect, and we took into account, I thought, all the things you're supposed to: An efficient work triangle. Easy-to-clean surfaces. Task lighting and ventilation. Plenty of storage for food and tableware. We even paid lots of attention to aesthetics and design compatibility — this was a new kitchen going into a nice old house.

So what'd we forget? GARBAGE! I have to admit, we didn't even think much about unseparated garbage (it goes under the sink, right?). We gave no thought to designing separate bins for recyclables. In retrospect, our oversight seems nothing short of stupid — but it's a common one. Nobody talks about it, and the need wasn't readily apparent. In New York City, garbage got picked up twice a week — period. And none of the "kitchen ideas" books even touched on the subject.

Things are rapidly changing. A year after our kitchen was done, mandatory recycling started in parts of New Jersey; now voluntary recycling has begun in my Brooklyn neighborhood. It is very clear that separated trash and recycling will be standard soon. Time to work on integrating that reality into the design of our houses!

The kitchen, with its constant flow of materials in and various types of waste out, is the obvious place to start. In the past hundred years, social and technological changes have transformed kitchen design. Our absolute need to look at garbage differently will bring about the next sweeping change. Look for built-in composters and vented cabinets, chutes that carry used materials to storage bins in the cellar or yard, base cabinets that are actually rolling bins.

But that's in the future, and for new houses. What should you think about now when you tackle a minor or major kitchen renovation? Three designers share ideas in the pages that follow. A lot of this is ad-hoc by necessity, while we wait for manufacturers to catch up. (Off-the-shelf solutions would be awfully nice. Anybody listening?)

We'd love to hear back from you if you've come up with your own solutions.

— Patricia Poore

The only thing onerous about recycling is that our kitchens aren't designed to accommodate it. It's no fun to look at an open box of plastic bottles or trip over a noisy pile of aluminum cans stashed near the back door. Nor do you want to open the door under the sink and confront an overflowing bin of newspaper cascading into a smelly slop bucket of yesterday's cucumber leftovers. The fact is, discarded materials, when they are stored in a haphazard way, make the kitchen feel dirty and unkempt.

To make recycling a part of life — and get the rest of your household to cooperate — there are a few rules to follow:

- Make it really *obvious* what goes where.
- Build in enough room for each type of recyclable.
- Locate the holding bin near the use site. (Compost bin near the vegetable-cutting surface; bottle storage near the fridge.)
- Bins or drawers must be easy to empty and easy to clean.
- Don't put anything in a traffic area.
- Design things to be aesthetically acceptable. For example, a painted pine bin is preferable to a dog-eared cardboard box.

If you're designing a kitchen from scratch, design for maximum recycling (it's coming) and build everything in (it's more efficient and attractive). If you're just trying to incorporate the recycling of a few items into an existing kitchen, you may not have to build anything. Simply allocate space and buy some containers.

For now, your recycling efforts depend to a great extent on what services are available in your town. Find out what's being recycled at all, what gets picked up, and what you'd have to deliver to a recycling center. If your state has a bottle bill, of course, empty beverage containers fetch a cash refund, but you'll have to take them back yourself to get it. All of these factors weigh into the design of your kitchen, because they determine how many (and what type) of categories of recyclables you have, and how long you have to store them. Basic categories include:

Compostable waste Most organic waste is compostable, including fruit and vegetable leavings, coffee grounds, oils, eggshells, grains, nuts and seeds, tobacco (but not cigarette filters), tea and tea bags, and small pieces of shredded paper. Meat, fish, and bones should be excluded from most compost, as they attract animals. Non-expert composters are encouraged to leave out onions (they smell bad) and citrus peels (they decompose slowly).

Paper Most paper waste generated in the kitchen is related to packaging. Unfortunately, various materials may be mixed into packaging: paper, recycled cardboard, cellophane, foil, etc. Ask your local recycling center how they want materials separated. Napkins and paper towels can be recycled. But it's very possible that most of your kitchen paper, for the time being, will have to remain "garbage": i.e., hauled away unsorted by the san-man, and slated for landfill or incineration.

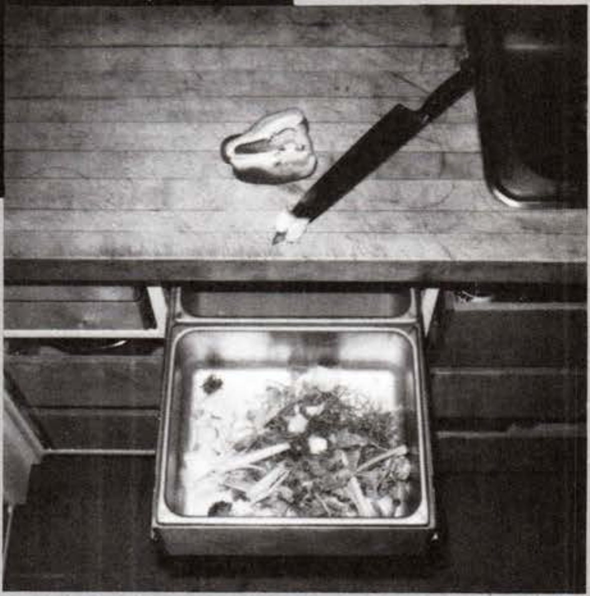
There's not much point in clogging up your kitchen with newspapers and magazines. These should certainly be batched and recycled, but better to do it in the back hall, cellar, or garage.

Refundable bottles and cans If your state has a bottle

Jonathan Poore is an architect in Gloucester, Massachusetts.

A Compost Drawer

KEN STEVENS



After 12 years of "living with it," I had to get serious about reworking my kitchen. High on the family's complaint list was the always-in-the-way, free-standing garbage can. Frequently knocked over, smelly and ugly, it had to go. But garbage seemed to us to have a positive side, too. We wanted to make use of the vegetable scraps — as compost for the garden. For a specific function like this, I was ready to buy an off-the-shelf product. Surely some company must make a scrap bin. No luck. I had turned to my brown-edged stack of *Whole Earth Catalogues* and to my dusty copy of *The Integral Urban House*. Nothing! The kitchen hardware sourcebooks were no better. *The Complete Haefele* offered solutions for both door-mounted and under-counter, pull-out wastebaskets, but *no* suggestions for small scrap containers.

So, it was going to have to be an original solution. Our main vegetable preparation area was properly positioned to the left of the double-well, stainless-steel sink. Sometimes we trimmed and chopped directly on the butcher-block worktop, and at other times we cut and trimmed on white plastic cutting boards. I considered cutting a hole in the worktop and positioning a scrap bin under the hole. Although I could have made a tight plug for the hole, we really didn't want to give up the work space, or contend with the likelihood of things falling in by mistake, or deal with cleaning the hole edges and underside of the counter due to drips and spills.

The solution was a synthesis of two things: Our general preference for drawers rather than base cabinets, and my familiarity with restaurant equipment. I built a pull-out scrap collector.

The crucial piece of equipment is the stainless-steel food pan, used in all chafing dishes and steam tables. The standard pan measures 12 inches by 20 inches, available in depths of 8, 6, 4, and 2-1/2 inches. It is durable, seamless, easy to clean, and has a rolled or flat top edge that makes it easy to suspend in a drawer frame. The half-pan — 12 X 10 — turned out to be right for us.

I suspended a pair of 4"-depth half-pans in a 12"-X-20" drawer equipped with full-extension-plus-one-inch Accuride slides. (These are superbly crafted.) The drawer itself was given two coats of gloss polyurethane, and mounted just under the vegetable-preparation area. When the drawer is open, scraps can be pushed over the counter edge into the pan. We'll often peel carrots and potatoes directly into the pan. The rear pan is used as a container for non-composting mixed plate scrapings. The pans lift out for emptying. Half-pans are a convenient size to wash by hand and fit in most dishwasher racks.

Stainless-steel food pans are available at restaurant supply houses. The half-pans (10-1/2" X 12-3/4" from edge to edge of the top flanges), sell for about $10 each. Domestic brand names include Vollrath, Polar Ware, and Bloomfield. You can buy less expensive pans made of clear or black polycarbonate, but these will tend to retain odors.

Our kitchen isn't quite finished. I'll install drawer fronts as soon as I locate the absolutely-right low-profile or recessed pull.... (Ah, the nightmare of being one's own client!) But the compost drawer has worked out great for us.

***Ken Stevens** is an industrial designer who specializes in the design of hotel and restaurant equipment. He's also a home renovator and freelance writer.*

law, you'll be keeping soda and beer containers to return for a refund or to donate to a volunteer group. Find out if you're supposed to separate glass, plastic, and aluminum. These accumulate quickly, so build in enough space or decide on a secondary holding area.

Glass Some recycling centers sort glass into different colors; others expect you to do it. Even if you have to do the sorting yourself, it might be more space-efficient to keep all glass together in one bin, and sort it when you're ready to put it at the curb or deliver it. Check locally to find out if paper labels must be removed at home.

Metals Besides returnable beverage cans, you still have to deal with other food cans, tins, and foil. Most recycling centers and pickup programs require you to separate aluminum from ferrous (iron-containing) cans. Again, you may have to peel off labels.

Plastics There are lots of different types (by resin) and they usually can't be mixed. The technology for plastics recycling is in its infancy. (See "Garbage at the Grocery," page 34.) Check with local authorities — and check again in six months or a year.

Hazardous wastes Some aerosol products, pesticides, batteries, etc.,etc. must be separated out, stored safely, and held for designated pickup or drop-off. Don't just throw it in the garbage; remember, there's no such thing as "away" when you throw it away.

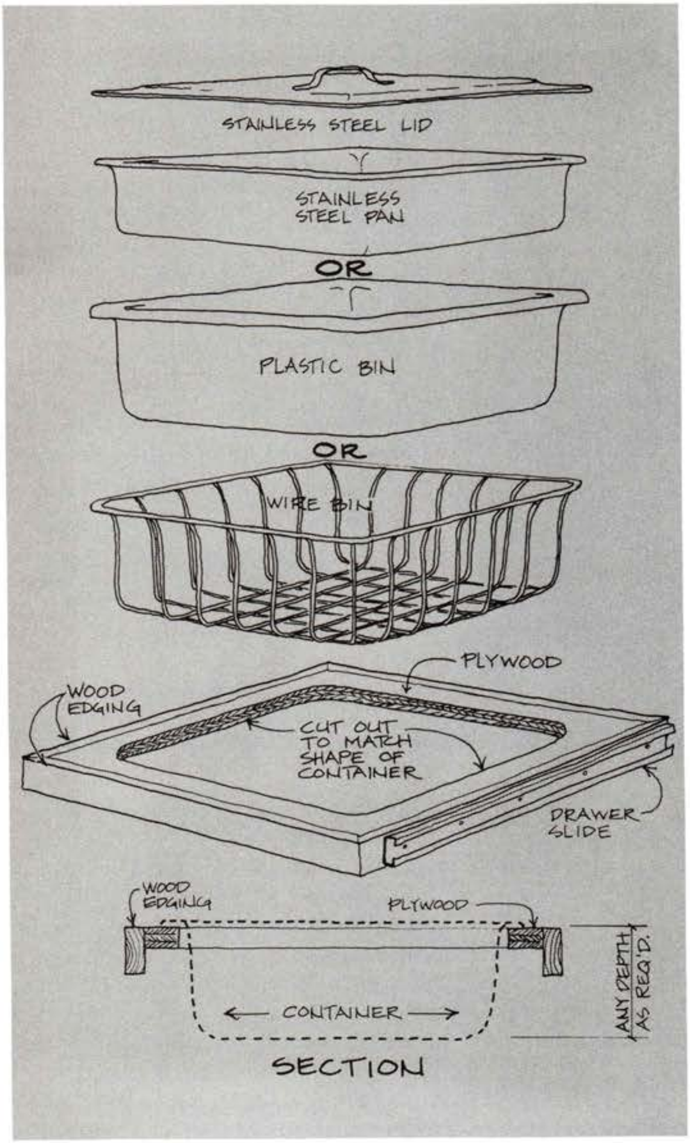
Once you've decided what categories you're going to recycle, estimate volumes. Each household is different. If you have curbside recycling, you probably need only enough storage for a week's worth. If you have to drive to a center, you'll need more storage space. Consider a biweekly transfer of materials stored in the kitchen to an intermediate storage area in the cellar, garage, or shed.

The next step is to find some space. If you're planning a new kitchen or remodeling one, allot cabinet or closet space for storage. The most efficient way to store recyclables is to have everything in one place (with the exception of organic waste, or compost). If you have to hunt all over the kitchen for the appropriate bin in which to deposit your beer can, it'll end up either in the unsorted garbage, or someplace where you'll trip over it. It's easier to go to one location, open a door, and deposit your refuse in the appropriately labeled receptacle.

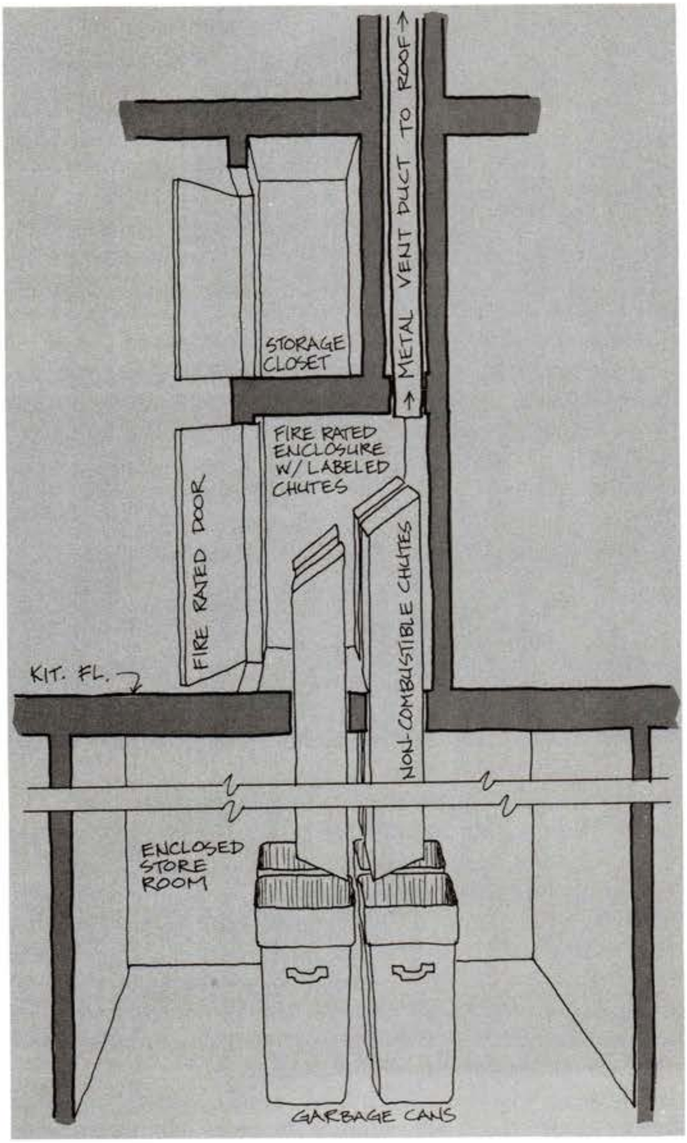
A solution for the new or remodeled kitchen is to create a pantry-type cabinet for recycling bins. If you buy a stock cabinet, customize the interior to suit your needs by dividing it with shelves, racks, partitions, and pullout bins. If you have a custom cabinet built, you can design it to the exact dimensions and proportions that suit your needs.

A small closet can be used similarly. A closet constructed of wood framing and drywall is a little cheaper and easier to build than a wood or laminate cabinet, but it's more space intensive because it has thicker walls and bulkier doors than a cabinet. You might also have a tough time integrating a closet into a kitchen. In an existing kitchen or one with severe space constraints, it may not be practical to give over an entire pantry-size cabinet for recycling. Perhaps you'll have to take materials out to an intermediate storage area more frequently; or, if you have an adjacent butler's pantry or mud room, you might set up storage in this area.

There are many different ways to detail the inside of a cabinet for storing items to be recycled. A simple plywood frame can be constructed, so that drawer slides can be mounted to the side and the containers of your choice set into the frame. The simplest way to do this: Cut a piece of plywood into a rectangle of the desired size, edge all sides of it with 3/4" solid wood, and trace the shape of the container onto the plywood. With a saber saw, cut a hole in the plywood slightly smaller than the outside dimension of the container, so that the lip of the container will rest on the plywood. The finished dimension of the frame assembly should be the proper width to permit clearance for the drawer slides to be mounted to the inside walls of the cabinet. The required clearance is usually given with the manufacturers' installation instructions provided with the slides. In other words, install these pull-outs



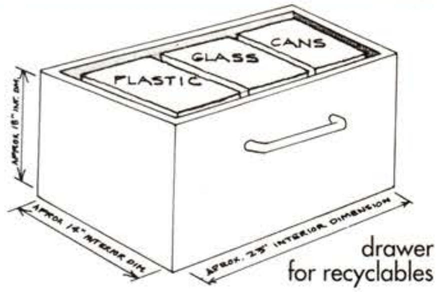
Pull-out bins for recyclables can be mounted in a plywood rack fitted with drawer slides.



Cutaway view of a laundry chute-type system for storing recyclables in the basement.

The Kitchen Garbage & Recycling Center

by David Goldbeck



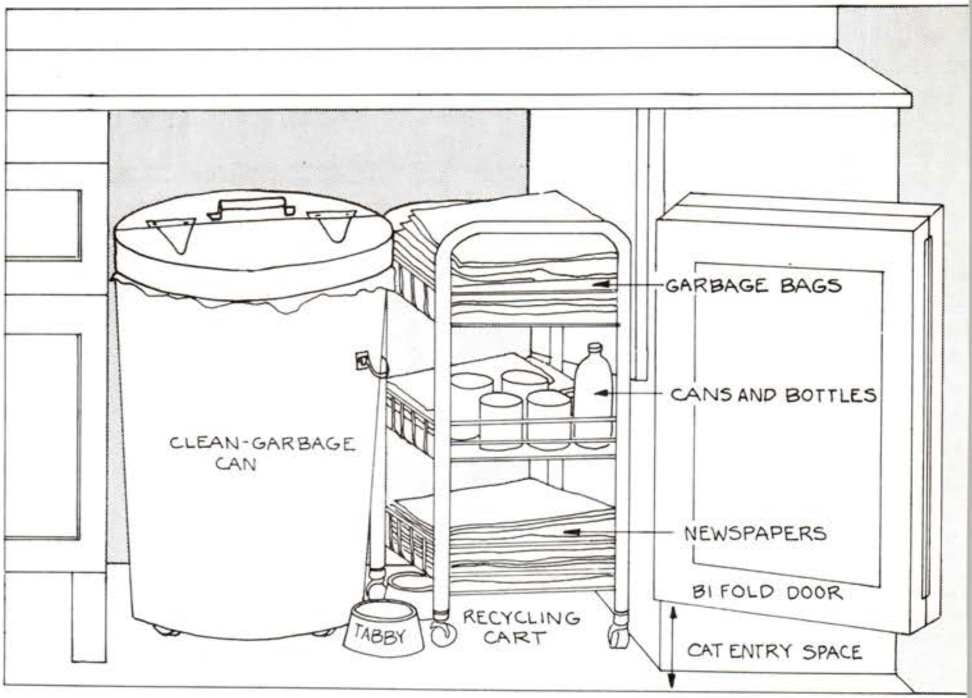
drawer for recyclables

Both composting and the recycling of newspapers, plastic, cans, and bottles save fuel, minimize solid-waste accumulation, and demonstrate an *active* concern for the Earth.

Because all food waste in my Demonstration Kitchen is composted, the rest of our garbage is odor-free, clean, and light. Thus it is no problem to accumulate large amounts — and a big garbage can minimizes inconvenience. (*Nobody* likes to take out the garbage!) I recommend a 20- or 30-gallon can, but the size depends on room available. Placing it on a small dolly or adding wheels underneath makes the can easy to move. Hide it behind a door, as I did. Either leave it topless, or have the top cut and hinged for quick access.

In my Demonstration Kitchen, the garbage can is hidden behind bifold doors hung approximately five inches below counter level. You can insert a hand even when the doors are closed, making small deposits convenient. To store larger amount of waste, you can easily open the doors and pull the can out. (Bonus: If you have a cat, you may want to use this as a protected feeding area. The design is especially useful if you also have a dog or infant whom you want to keep away from the cat food. Leave a 3- or 4-inch gap at the bottom so that Tabby can enter.)

Next to the garbage can, I placed a small rolling wire cart (commonly available in household supply stores) to hold extra garbage bags, newspapers, and returnable bottles. Mine is a small system in a relatively small kitchen. If you have more space and many returnables, create a larger system, perhaps one that holds



GARBAGE / RECYCLING AREA

Large garbage can on wheels minimizes "taking out the garbage." Recycling cart facilitates that task. Space below doors permits pet entry to food when door is closed. (This area is also ideal spot for adjustable-height counter.)

exactly as you would a conventional drawer.

You can install virtually any type of container you want into the frame: wire bins, plastic bins, or stainless-steel pans with removable lids. The containers can be any shape because the plywood can be cut out to any shape required. The container can be lifted out for transporting the materials and also for ease of cleaning. A stainless-steel warming pan with a cover, such as those used in commercial kitchens, can be used to store organic waste until you take it to the compost bin. These containers have tight-fitting lids, so odors will not escape.

If you're more adventurous — or you're doing major work on the home anyway — consider setting up simple chutes to storage bins in the cellar. It may seem like a lot of upfront work, but it'll save you time and effort (moving recyclables to intermediate storage) from now on — particularly if you have a large family. Your local building inspector may treat such a chute system like elevators, laundry chutes, and dumbwaiters. This means that the enclosure (walls and door) must be fire rated because, in case of a fire, an open shaft connecting one floor with another acts as a chimney and can cause fire to spread rapidly. A solution is to put several chutes into one enclosed, fire-rated closet, which leads to another fire-rated closet in the cellar. The term fire-rated sounds technical and intimidating, but the proper rating can often be achieved on the walls by having an extra layer of (fire-rated) gypsum board on each side of the wall. The door and frame will have to have a labeled fire rating, which means purchasing a slightly more expensive unit than an ordinary pre-hung door. A vent leading to the roof will also be required to allow heat and gases to escape to the roof in case of fire. Check your local code to see what is needed to satisfy the fire-safety requirements.

several buckets or bags, so you can presort plastics, glass, and paper, and take them directly to the store or recycling center. This is going to be more and more necessary as municipalities enact mandatory garbage-separation ordinances.

Kitchen redesign is an important ally of the recycler. Kitchen drawers are a good place to start. A simple plan uses a single 36-inch-high drawer designed around four side-by-side plastic containers. Each container holds a standard paper grocery bag for glass, paper, metal, and nonrecyclable trash. Other designs use more than one drawer — which, if you have the space, will minimize overflow. On pickup days, the bags merely have to be pulled out. Another experienced builder of recycling systems suggests that the space below the sink not be used for storage of soap and cleaning aids, to free it up as a convenient recycling location.

The most ambitious system I've come across uses chutes that carry materials to cans in the basement. In the future, such systems should be standard in new residences, venting to outside containers that could be picked up regularly, just as unsorted garbage is now picked up.

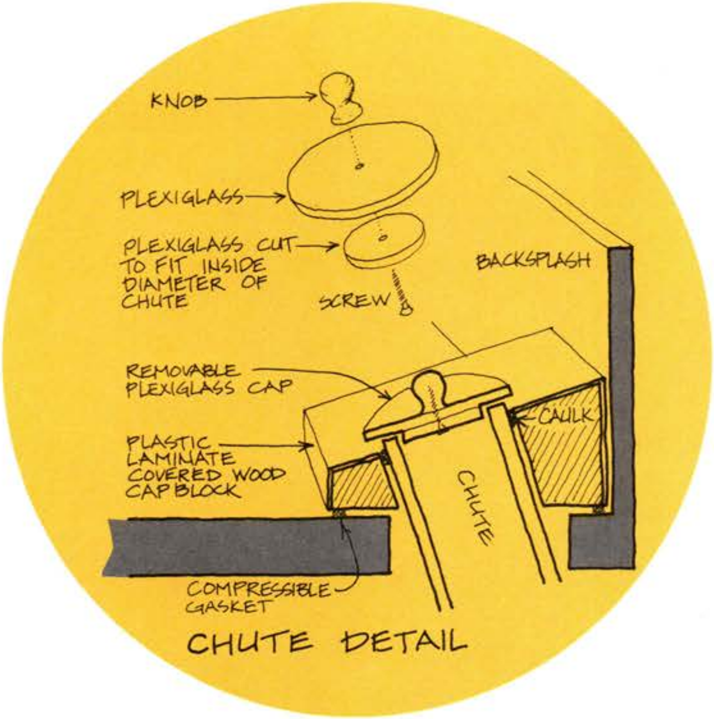
David Goldbeck *is the author of* The Smart Kitchen *(p. 24). His ideas for more efficient and user-friendly kitchens range from simple solutions to revolutionary design changes, and his book devotes many pages to energy conservation, recycling, and composting. Photos are from his own "demonstration kitchen," where he puts ideas into practice.*

photo by Robert Perron

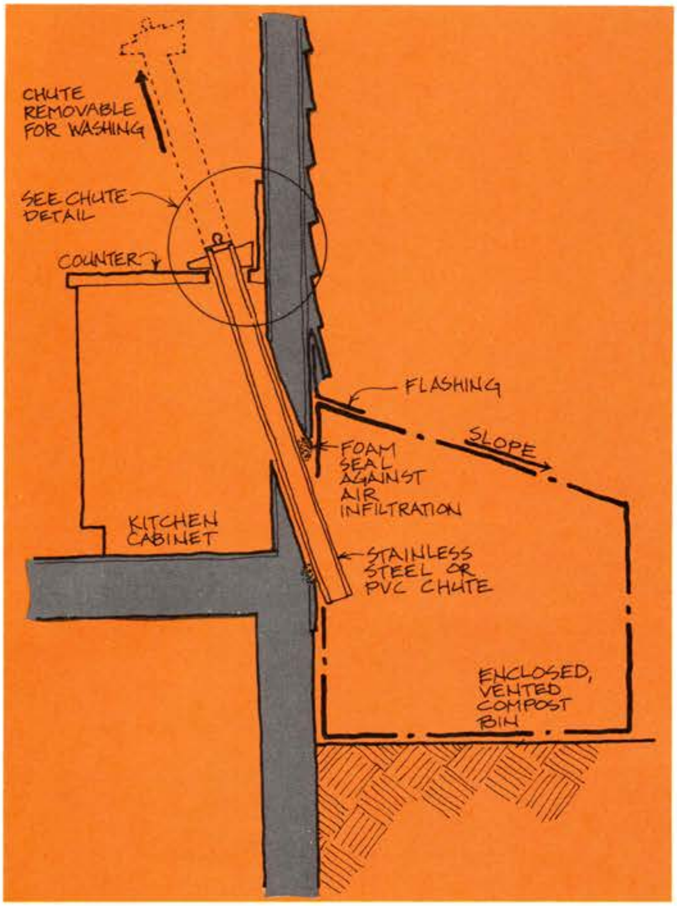
Within the closet, you might have several different labeled chutes for each type of waste. The chutes can be made of metal such as sheet-metal ductwork. All of this is illustrated on page 21. The only categories this system wouldn't accommodate are organic waste and glass (which would shatter). An advantage of this system is that just the lower third or so of the closet would contain the chutes, while the entire upper portion of the closet could be used for ordinary storage. (Don't use it for storing flammable materials; the building code may require that the upper portion of the closet be a separate compartment.) The chutes could empty into fairly large holding bins in the cellar, which would have to be emptied only periodically. This *would* mean that you'd have to be diligent about rinsing and draining food and beverage containers and making sure that no organic waste went down by accident — or else mold, putrefaction, and insects would be a problem. Not to mention the smell.

ORGANIC WASTE

A convenient way to store organic waste is in a stainless-steel container somewhere in the kitchen. (A plastic container will absorb odors, and as its finish gets roughed up with continued use, it will stain and become more difficult to clean.) A sealed container is a little better than an open one, because even after a couple of hours, especially in hot weather, organic waste starts to smell unpleasant. If the compost bucket can be stored someplace that's well ventilated, such as a back porch, then sealing it may not be as important; but you'll have to decide whether it's easier to open the back door or lift a lid. A *small*, pedal-operated garbage can with an enamelled lift-out bucket is great for this. Try to avoid



As long as this article is about kitchen *design*,
here's the ultimate solution: a chute for organic waste
that goes from kitchen counter straight to the compost bin.
Note fitted plug.


CHUTE REMOVABLE FOR WASHING
SEE CHUTE DETAIL
COUNTER
FLASHING
SLOPE
FOAM SEAL AGAINST AIR INFILTRATION
KITCHEN CABINET
STAINLESS STEEL OR PVC CHUTE
ENCLOSED, VENTED COMPOST BIN

using plastic liners, which can't go into the compost and which, undoubtedly, are too much of a pain to wash out and reuse. A compostable compost-bucket liner is an idea whose time has come — like the organic "pots" in which nursery plants are grown.

The next dilemma is where to *put* the compost bucket. Most often I've seen two solutions, both unpleasant: out on the counter, and in a slop bucket under the sink. Yecch. And it's not convenient to bend down under the sink. A solution often used in commercial kitchens is to have a cutout right in the countertop, with a removable container below. This gets it out of sight and is very convenient if you chop lots of vegetables, but it doesn't solve the odor problem.

As long as this article is about kitchen *design*, let's consider chutes for organic waste. In this case, fire safety is not an issue, as the chute should feed into a compost bin outdoors. With a compost bin connected to the house, it's essential that the bin be completely sealed against insects and vermin. The composting process must also be monitored and managed very carefully to insure that putrefaction does not occur, causing odor and potential health problems in the house.

Ideally, the chute should be designed for installation at a very steep angle, so waste won't get stuck part-way down. It should also be as short and straight a run as possible. A removable liner, which can be occasionally taken out, hosed down, and disinfected, would also be a good idea. The chute could be made out of PVC pipe. (Stainless-steel pipe could also be used, but any seams or joints should be kept to a minimum and should be tight enough so as not to collect debris.) The chute can be located at counter height or set right into the counter. A tight-fitting plug should be installed on the kitchen end of the chute. It must be able to seal out drafts and odors (although a well managed composting process is nearly odorless), yet be convenient to remove frequently for use.

If you set up a streamlined way of handling recyclable materials, your everyday routine will be simplified. Better get used to it: What is voluntary recycling now may be mandatory in the not-so-distant future.

It's also a matter of gradual shifts in attitude. If we start recycling more materials, and manufacturers start marketing their products with less throw-away packaging, it'll reduce the strain on overburdened landfills. I guess the point is to start small but start somewhere.

FOR MORE IDEAS

The best information we've seen on environmentally-aware kitchen design is David Goldbeck's brand-new book: *The Smart Kitchen, How to Design a Comfortable, Safe, Energy-Efficient, and Money-Saving Workspace.* Suggestions are common-sense and practical; some are quite simple to put into practice. The book is available only from the publisher. Send $17.95 (ppd.) to: Ceres Press, Dept. GM, P.O. Box 87, Woodstock, NY 12498.

THE TRUTH ABOUT SEAFOOD

by Lisa Y. Lefferts

Fish seemed like the perfect food. Health experts told us it's low in saturated fats yet high in protein, vitamins, and minerals. It's low in calories! And swordfish grilled over mesquite does have a certain cachet.

Perfect — until last summer, when sewage and syringes washing up on beaches captured the headlines. Suddenly, reporters were turning up evidence of pesticides in finfish, microbes in mollusks, worms in sushi.

How risky is seafood? Are fish caught in polluted waters the primary worry, or should we be wary of eating anything aquatic? Which contaminants pose the biggest threats? Is there any way to eat fish safely, short of running every fillet through a gas chromatograph to test for toxins in your own kitchen?

We asked Lisa Lefferts, Staff Scientist with the Center for Science in the Public Interest in Washington, D.C, to assess the risks of eating fish. Her report tells us that fish is generally still a healthy food. Yet the article disturbed us.

When you consider the data Lisa presents on the pesticides, toxic metals, and industrial chemicals now found in fish, consider the larger tragedy as well. For decades, we accepted on faith that great bodies of water like Lake Ontario, the Puget Sound, and the oceans are so vast that all our poisons could never taint them. Only now are we facing up to how wrong we were.

This article isn't just about what not to have for dinner. It is, perhaps, about the death of something pure.

— the editors

Americans were eating 20 percent more fish and shellfish and four percent less beef in 1987 than in 1980. This looks like another healthy trend of the 1980s, in line with health experts' recommendations to cut down on saturated fats, cholesterol, and calories.

But is it?

"Warning: Bottomfish, Crab, and Shellfish May Be Unsafe Due to Pollution," reads a sign at Washington's Puget Sound.

Dumped sludge, overflowing sewers, oil spills, pesticide runoff, industrial waste, and other pollutants eventually get into lakes, streams, coastal waters, and the ocean. Oysters and clams can ingest these contaminants; so can simple forms of life that are eaten by small fish, which in turn are eaten by larger fish. Eventually, pollutants end up on our plates.

The risks from contaminated fish run the gamut from immediate food poisoning to chronic diseases such as cancer. Illnesses that occur soon after eating are easiest to trace. From 1983 through 1987, 56 percent of the food poisoning outbreaks linked to "meat" were due to seafood, although seafood comprised only eight percent of the "meat" consumed during that time.[1] The outbreaks were caused by bacteria, viruses, and natural toxins, which result in symptoms such as chills, diarrhea, vomiting, or occasionally even death. *Most of these illnesses can be avoided by following proper handling and cooking methods.*

However, the long-term effects from pesticides, metals, and industrial chemicals pose a more intractable problem, one that can't be eliminated simply by cooking and handling seafood properly.

The odds of getting cancer from eating even a weekly eight-ounce meal of lake trout caught in Lake Ontario are relatively high, according to Larry Skinner, principal fish and wildlife ecologist with the New York State Department of Environmental Conservation. If you're eating fish caught in New York's Hudson River, the odds are worse. New York State has been issuing advisories for years warning people to stay away from some Hudson River fish and lake trout from Lake Ontario.

Lake Ontario and the Hudson River, both extremely polluted, are worst-case examples. However, to one degree or another, fish taken from any body of water is a potential vehicle for industrial chemicals, pesticides, and toxic metals.

Fish spend their lives immersed in the same waters we use to dump or carry off our chemical pollutants. That makes them good barometers of the chemical contaminants in our lakes, rivers, bays, and oceans; and their illnesses, a clear danger signal for humans.

Fish and shellfish with cancerous tumors have been identified in 25 locations across the country, and "the list keeps growing," according to Dr. John D. Harshbarger, director of the Registry of Tumors in Lower Animals at the Smithsonian Institution in Washington, D.C. He suspects that the tumors are caused by PAHs (polycyclic aromatic hydrocarbons) which end up in the water after being formed in the air when coal, wood, and oil are burned.

Harshbarger says the areas with the highest incidence of cancer in fish are New York's Hudson River, the Black River in Ohio, the Puget Sound, Boston Harbor, and Hamilton Harbor in Lake Ontario.

Since 1984, the National Oceanic and Atmospheric Administration (NOAA) has been monitoring the levels of contaminants in sediments and in oysters, mussels, and the livers of various benthic, or bottom-dwelling, fish in U.S. coastal waters. DDT and other pesticides, polychlorinated biphenyls (PCBs), PAHs, and toxic metals such as arsenic, chromium, mercury, cadmium, and lead are among the contaminants found. The most contaminated sites, according to NOAA, are near the coastal cities Boston, New Bedford (Massachusetts), New York, Philadelphia, Wilmington (Delaware), Baltimore, Tampa, Galveston, San Diego, Los Angeles, San Francisco, Oakland, Seattle, and Tacoma (Washington). (See "Hot Spots" on page 28.)

Precisely what health risk this poses for humans is less certain, especially the cancer risks of DDT, PCBs, and other substances. For obvious ethical reasons, scientists are not allowed to perform controlled experiments on the effects of suspected carcinogens on humans. And tumors don't come with a label reading "I'm from the bluefish you ate in 1965." Consequently, cancer assessments are based on risks extrapolated from animal tests. "We don't run cancer studies on humans," explains Sherry Sterling, former chief of the Health Sciences section of the office of Waste Programs Enforcement at the U.S. Environmental Protection Agency (EPA). "We rely on animals as a model for the human system."

• INDUSTRIAL CHEMICALS

Most of the estimated cancer risk of eating fish is attributed to PCBs,[2] which have been produced since the 1920s and used in a wide range of products, from capacitors, transformers, and hydraulic fluids to inks, adhesives,and carbonless copy paper.

In 1971, the Monsanto Company, the principal U.S. manufacturer of PCBs, voluntarily restricted the chemical's use to "closed" systems, such as electrical transformers and capacitors, in which the PCBs are housed in a sealed container. Eighteen years later, PCBs continue to show up in high concentrations in wildlife and fish.

PCBs are considered "probable carcinogens" in humans. That means they cause cancer in animals but definitive proof that they've caused cancer in humans is still lacking.

What scientists have known for a long time is that high levels of PCBs can adversely affect behavior in developing animals and humans. In 1984, researchers at Wayne State and other universities demonstrated for the first time that *low* levels can be harmful as well.[3]

The study examined 242 infants of women who reported regularly eating an average of two or three meals per week of Lake Michigan fish contaminated with PCBs. At birth, the babies weighed five to seven ounces less than babies whose mothers had not eaten the contaminated fish. Weak reflexes and sluggish movements, as well as other signs of delayed behavioral development were also linked to maternal exposure to PCBs. In another study, seven-month-old babies whose mothers ate PCB-tainted fish while pregnant scored more poorly on memory recognition tests than unexposed babies.[4]

• PESTICIDES

Fish and seafood products more frequently contain pesticide residues than fruits, vegetables, dairy products, and grains, according to the Food and Drug Administration (FDA). (Beef and poultry are monitored by the U.S. Department of Agriculture, not the FDA.) The pesticide most often found in fish, according to the FDA, is DDT and its by-products. DDT, a probable carcinogen in humans, was banned in the U.S. in 1972 but has persisted in the

***Lisa Y. Lefferts** is Staff Scientist with the Center for Science in the Public Interest, a consumer group based in Washington, D.C. She also wrote about seafood in the October 1988 Nutrition Action Healthletter, published by the Center for Science in the Public Interest, 1501 16th St., NW, Washington, D.C. 20036; (202) 332-9110.*

A Buyer's Guide to Safe Fish

How likely is your favorite fish to contain high levels of contamination? Since there's no mandatory inspection program for fish and shellfish, it's hard to know for certain. One reliable indicator of potential contamination is fat content, since pesticides and PCBs tend to accumulate in fatty tissue. Another indicator is location: Offshore fish are less likely to be contaminated than nearshore or freshwater varieties.

Listed below are the most popular fish in order of fat content, with the fattiest at the bottom. (Shellfish aren't included, since there's little relationship between their fat and contamination levels.)

The best fish to choose are offshore species, particularly those low in fat (nearer the top of the list).

Freshwater	*Nearshore	*Offshore
yellow perch	striped bass[2]	cod
freshwater bass	pink salmon	haddock
white perch	bluefish[2]	pollock
brook trout	chum salmon	yellowfin tuna
rainbow trout	sockeye salmon	flounder
catfish[1]	sardines	ocean perch
carp[1]	herring	skipjack tuna
lake whitefish		swordfish[3]
lake trout		Pacific halibut
		albacore tuna

[1] Catfish and carp are bottom feeders, and are particularly vulnerable to contamination from tainted sediments. Wild catfish had the second highest average contaminant level of all fish analyzed by the FDA in 1983. (Fish roe was first.)

[2] Migratory fish such as striped bass and bluefish are frequently tainted with PCBs, even if they're caught offshore.

[3] Swordfish frequently exceed allowable levels of methyl mercury.

*The border between "nearshore" and "offshore" is three miles from the U.S. coastline.

Sources: J. *Amer. Diet Assoc. 86*: 788, 1986 and National Marine Fisheries Service, *Fisheries of the U.S., 1986*, 1987.

—Lisa Y. Lefferts

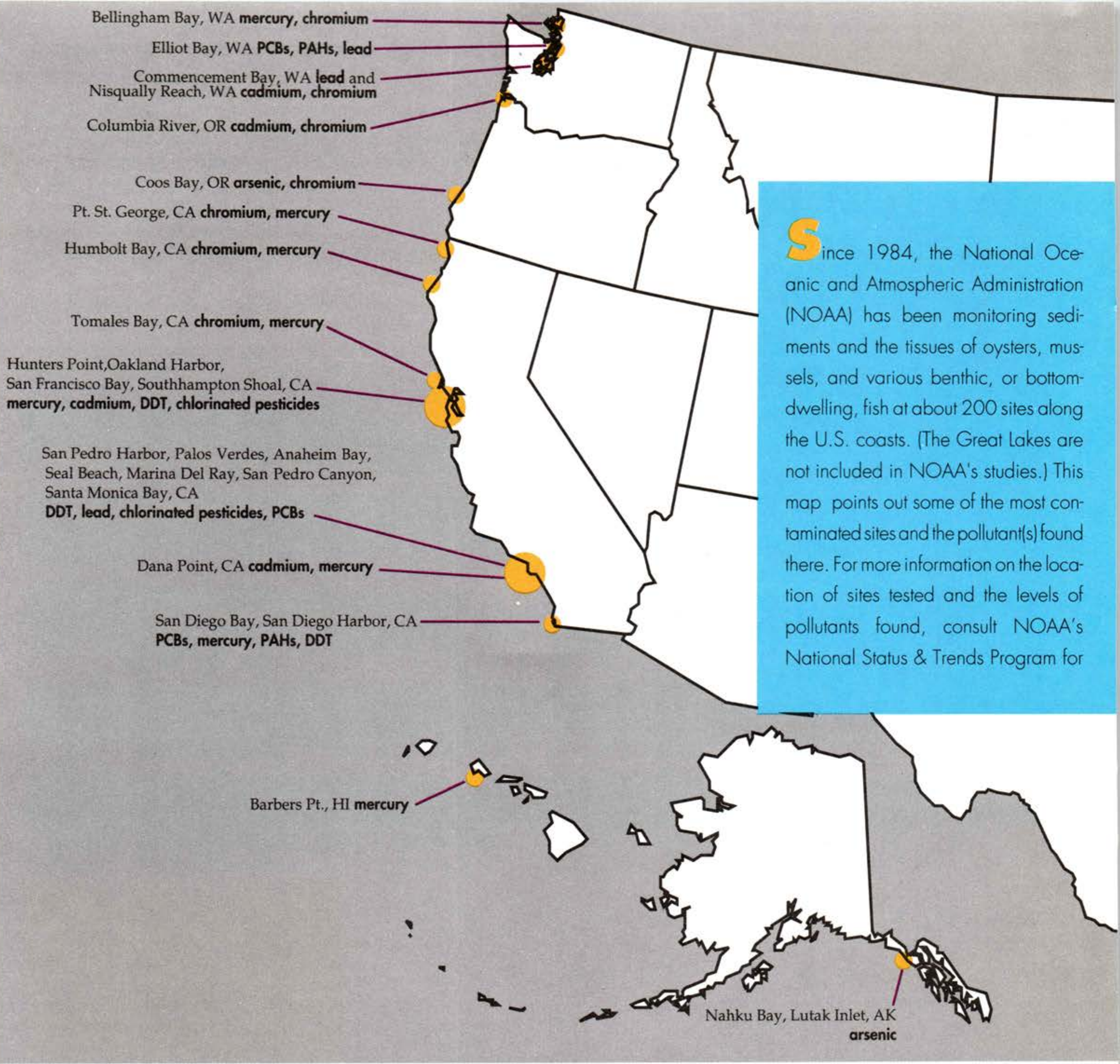
environment. In 1983, the FDA tested 386 samples of domestic fish for traces of the pesticide. It found DDT in an incredibly high 334 of them — more than a decade after its use was halted. More recent studies by the National Oceanic and Atmospheric Administration and the FDA continue to find DDT in fish tissues. However, according to NOAA ecologist Alan Mearns, DDT levels are declining slowly nationwide.

Another frequently found fish contaminant and probable cancer-causer in humans, according to the EPA, is chlordane, which has been widely used to control termites.

• TOXIC METALS

Lead, cadmium, chromium, and arsenic are four of the most toxic of the metals found in fish. These metals come from a variety of sources, including mining, chemical manufacturing, sewage sludge, coal burning, and natural sources. Toxic metals can cause health problems ranging from kidney damage (chromium) and impaired mental development (lead) to cancer (arsenic). Studies have shown that these metals accumulate most in oysters, clams, and mussels.

High levels of methyl mercury are most often found in large predatory fish such as shark, swordfish, large tuna, halibut, and marlin. Various forms of mercury in the environment can be converted to methyl mercury by microorganisms, thereby introducing this most toxic form of the metal into the food chain. Methyl mercury attacks human nerve cells and is especially dangerous to the fetus and nursing infants, so pregnant and breastfeeding women should avoid these species. While no one is arguing that the amounts of methyl mercury in U.S. fish today are causing an epidemic of retarded children, when the stakes are so high, it makes sense to err on the side of caution.


Bellingham Bay, WA **mercury, chromium**
Elliot Bay, WA **PCBs, PAHs, lead**
Commencement Bay, WA **lead** and
Nisqually Reach, WA **cadmium, chromium**
Columbia River, OR **cadmium, chromium**
Coos Bay, OR **arsenic, chromium**
Pt. St. George, CA **chromium, mercury**
Humbolt Bay, CA **chromium, mercury**
Tomales Bay, CA **chromium, mercury**
Hunters Point,Oakland Harbor,
San Francisco Bay, Southhampton Shoal, CA
mercury, cadmium, DDT, chlorinated pesticides
San Pedro Harbor, Palos Verdes, Anaheim Bay,
Seal Beach, Marina Del Ray, San Pedro Canyon,
Santa Monica Bay, CA
DDT, lead, chlorinated pesticides, PCBs
Dana Point, CA **cadmium, mercury**
San Diego Bay, San Diego Harbor, CA
PCBs, mercury, PAHs, DDT
Barbers Pt., HI **mercury**
Nahku Bay, Lutak Inlet, AK
arsenic

Since 1984, the National Oceanic and Atmospheric Administration (NOAA) has been monitoring sediments and the tissues of oysters, mussels, and various benthic, or bottom-dwelling, fish at about 200 sites along the U.S. coasts. (The Great Lakes are not included in NOAA's studies.) This map points out some of the most contaminated sites and the pollutant(s) found there. For more information on the location of sites tested and the levels of pollutants found, consult NOAA's National Status & Trends Program for

• MICROBES, PARASITES, AND NATURAL TOXINS

A variety of bacteria, viruses, natural toxins, and parasitic worms can contaminate fish and shellfish, some from sewage-polluted water and some from improper handling.

Infections from parasitic worms are on the rise as the popularity of raw dishes such as sushi and sashimi soars. For example, anisakiasis is caused by anisakid worms, which can penetrate the lining of the stomach and intestine, causing fever, nausea, and abdominal pain. Although anisakiasis is still uncommon, more than 70 percent of all reported cases in the U.S. have occurred in the 1980s. Pacific salmon and Pacific rockfish (red snapper), when eaten raw, are the fish most frequently linked to the disease.[5] Thorough cooking kills anisakid worms, as well as many disease-producing microbes (see "How to Buy and Prepare Fish Safely" on page 30).

Almost 90 percent of all reported seafood-related illnesses are the work of relatively few kinds of contaminated fish:[6]

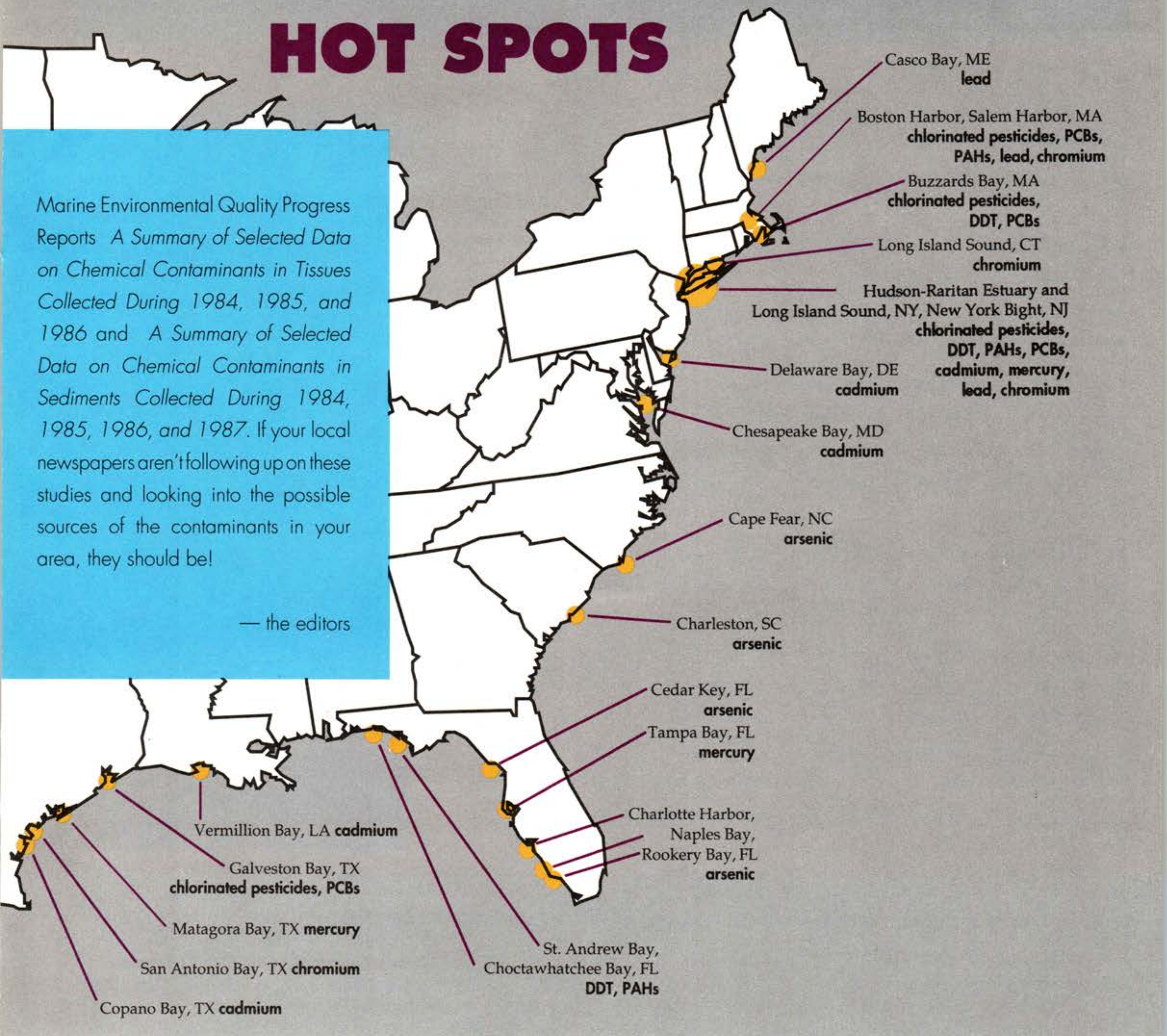
- Mollusks (clams, oysters, mussels, and snails), particularly when raw. Viral and bacterial contamination can result in symptoms ranging from mild diarrhea and nausea to cramps, fever, vomiting and, in extreme cases, death. Hepatitis A and Norwalk viruses (intestinal viruses) enter shellfish living in water polluted with inadequately treated sewage. When shellfish is handled improperly, *Salmonella* bacteria can multiply to levels which can cause food poisoning. (*Salmonella* can also be a problem in any improperly handled fish.) A variety of *Vibrio* bacteria can infect seafood in waters polluted by sewage, as well as unpolluted waters. The key to reducing your risk from these microorganisms is to avoid eating shellfish raw.

Although much less common than viral and bacterial con-

HOT SPOTS

Marine Environmental Quality Progress Reports *A Summary of Selected Data on Chemical Contaminants in Tissues Collected During 1984, 1985, and 1986* and *A Summary of Selected Data on Chemical Contaminants in Sediments Collected During 1984, 1985, 1986, and 1987.* If your local newspapers aren't following up on these studies and looking into the possible sources of the contaminants in your area, they should be!

— the editors


Casco Bay, ME **lead**
Boston Harbor, Salem Harbor, MA **chlorinated pesticides, PCBs, PAHs, lead, chromium**
Buzzards Bay, MA **chlorinated pesticides, DDT, PCBs**
Long Island Sound, CT **chromium**
Hudson-Raritan Estuary and Long Island Sound, NY, New York Bight, NJ **chlorinated pesticides, DDT, PAHs, PCBs, cadmium, mercury, lead, chromium**
Delaware Bay, DE **cadmium**
Chesapeake Bay, MD **cadmium**
Cape Fear, NC **arsenic**
Charleston, SC **arsenic**
Cedar Key, FL **arsenic**
Tampa Bay, FL **mercury**
Charlotte Harbor, Naples Bay, Rookery Bay, FL **arsenic**
Vermillion Bay, LA **cadmium**
Galveston Bay, TX **chlorinated pesticides, PCBs**
Matagora Bay, TX **mercury**
San Antonio Bay, TX **chromium**
Copano Bay, TX **cadmium**
St. Andrew Bay, Choctawhatchee Bay, FL **DDT, PAHs**

tamination, paralytic shellfish poisoning (PSP) and neurotoxic shellfish poisoning also pose risks. They're both caused by small organisms called dinoflagellates, and are a problem in raw *and* cooked fish. PSP begins with tingling and numbness and can be fatal. The symptoms of neurotoxic poisoning are similar to those of PSP, but they're usually less severe. Most cases of PSP are from non-commercially harvested shellfish.

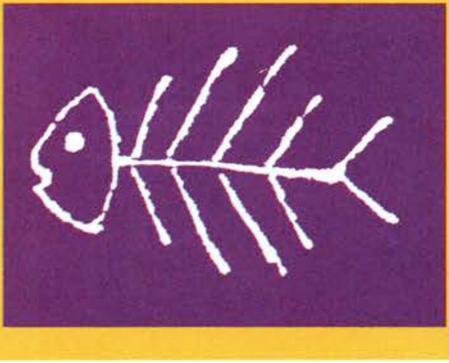
• Tropical species of fish, including barracuda, kingfish, jack, queen triggerfish, and some species of snapper and grouper. These are most likely to contain ciguatoxin. Ciguatera is the most common form of finfish poisoning in the U.S., although most cases occur in Florida and Hawaii. Ciguatera is a public health hazard primarily in the Pacific and Caribbean islands. Researchers hypothesize that ciguatoxin, which causes the disease, is caused by a type of dinoflagellate ingested by fish when they feed on algae in tropical waters. Ciguatoxin is extremely toxic; death occurs in about seven percent of the cases.[7] Symptoms include nausea, diarrhea, tingling of the mouth and feet, numbness, and weakness.

•Tuna, bonito, mackerel, and mahi-mahi. These fish are most likely to accumulate histamine when they spoil, which causes an allergic-type reaction known as scombrotoxic fish poisoning. After ciguatera, it is the most common form of food poisoning linked to finfish. Symptoms include nausea, abdominal cramping, vomiting, headache, diarrhea, fever, flushing, and rapid pulse. Histamine is a chemical formed by the action of bacterial enzymes on the amino acid histidine that occurs naturally in the flesh of these species. Histamine is not destroyed by cooking and can be present without any obvious signs of spoilage. To prevent high levels of histamine from forming, these fish must be continuously refrigerated or kept on ice. Although the term "scombrotoxic" comes from "Scombroid" fish (a family including tuna,

How To Buy & Prepare Fish Safely

- Eat a *variety* of fish and shellfish.
- Whether at the market or in a restaurant, avoid fish caught from nearshore waters close to a major city or industrial area.
- Buy shellfish only from established, reputable sources, since illegally harvested shellfish are most likely to contain viral and bacterial contaminants.
- If you catch your own fish, check with the state or local health or environment department to see if it has issued advisories limiting or banning consumption in the area.
- If you're pregnant (or think you might be) or you're breastfeeding, don't eat bluefish, striped bass, swordfish, shark, or any freshwater fish. And to reduce exposure to mercury, which is particularly damaging to fetuses and nursing infants, limit your consumption of tuna to eight ounces per week.
- Select young (small) fish, which have had less time to accumulate contaminants.
- Keep seafood refrigerated at 32 to 40 degrees F or frozen at 0 degrees F. Many refrigerator freezer compartments don't reach 0 degrees F, so don't store frozen fish there too long.
- Trim away the skin, the fatty belly flap, and any dark meat before cooking. That's where the highest chemical contaminant levels are found.
- Keep raw and cooked seafood separate, to prevent cross-contamination by microbes.
- Use cooking methods that minimize your intake of fish fat. Broiling on an elevated rack, baking, and boiling in water are best. Cut back on sauces made from the liquid drippings or cooking water. And avoid stews that call for whole fish with internal organs intact, since toxins accumulate there.
- Cook fish and shellfish thoroughly. Fish must be heated to the core at 140 degrees F for five minutes to kill parasites. Steam oysters, clams, and mussels for four to six minutes to kill viruses that might be present.
- Minimize your consumption of raw and undercooked fish (sushi, sashimi, ceviche). Avoid raw shellfish entirely if you have chronic liver or kidney disease, cancer, diabetes, or any disease that impairs immunity.
- Don't eat the "mustard" (hepatopancreas) in blue crabs or the "tomalley" in lobsters, since PCBs and cadmium concentrate in these organs.

— Lisa Y. Lefferts



bonito, and mackerel), scientists now know that other species can be affected.

• THE FDA'S ROLE

The Food and Drug Administration is the primary agency on the federal level with the responsibility of ensuring that seafood is safe. To protect consumers from tainted fish sold commercially, the FDA is supposed to set limits for specific contaminants and to remove from the marketplace fish that exceed these limits. For a number of reasons, however, the system doesn't come close to safeguarding our seafood supply:

- The FDA has assigned limits to only a dozen or so of the hundreds of contaminants that scientists have identified in fish.
- Most of the limits the FDA has set are not even legally binding, since a 1987 court case ruled that they were not established using rulemaking procedures that allow for public notice and comment. Until the FDA reproposes these limits and solicits public comment, they will not be legally enforceable.
- Many FDA limits set in the past do not measure up to today's scientific standards. After applying current risk-analysis techniques to data on the effects of DDT and another pesticide, dieldrin, on animals, Dr. Jeffrey Foran of the National Wildlife Federation's Great Lakes Natural Resources Center concluded that people who consume fish from the Great Lakes at least weekly may face excess cancer risks if the fish is contaminated even at one-third to one-fifth of the FDA's limit for these pesticides.[8]
- Government inspectors monitor only a tiny fraction of the fish and shellfish consumed. According to Ellis Gunderson of the FDA, approximately 1,100 20-pound samples of fish were analyzed for chemical contamination in 1986, or 22,000 pounds, out of 3.5 billion pounds consumed that year. In other words, the FDA inspected six pounds of fish for every million pounds eaten.
- Government regulations are designed to protect average consumers, not seafood lovers. To make matters worse, the FDA's definition of "average" is stingy. For example, the FDA's legal limit for PCBs, designed to protect the average consumer, is 2 parts per million. But if once every 40 days you eat more than four ounces of catfish, carp, buffalo fish, freshwater or sea trout, bass, chub, bluefish, porgy, drum, or mackerel, you're above average.[9] (One restaurant serving of fish is about four ounces.)
- Federal regulations apply only to fish and shellfish sold across state lines. State and local governments are responsible for issuing health advisories for consumers of fish caught locally or recreationally. These warnings are often ignored.

- While the FDA's maximum contaminant levels are supposed to protect the consumer's health, by law they also must take into account their economic impact on food-producing industries.

• GOOD FISH/BAD FISH

The nutritional benefits of eating seafood are undeniable. Fish is low in saturated fats and (except for fish roe and shellfish) cholesterol. Yet it's high in omega-3 fatty acids, which scientists are studying for their possible protective powers against heart attack and stroke. Seafood is also an excellent source of protein, B vitamins, and trace minerals.

Do the dangers of contamination mean we should ignore these nutritional benefits and avoid seafood entirely? In a word, no!

There's no need to stop eating seafood, but you should be selective when buying or ordering fish, and you should vary the types of seafood in your diet just to be safe.

Since the open ocean tends to be less polluted than lakes, rivers, and coastal waters, fish that live on the high seas — cod and haddock, for example — are generally safe choices. Be aware, though, that migratory species like bluefish and striped bass are frequently tainted with PCBs even if they're caught in the ocean. That's because they could well have spent a good portion of their lives in polluted inland rivers.

The fish *least* likely to have high contamination levels appear to be haddock, pollock, and cod. They're all low in fat, and the few tests that have been done have turned up few toxic contaminants. Small (young) tuna is also a safe choice, but chances are that large tuna has been around long enough to have accumulated high levels of mercury. Madeleine Parks of Chicken of the Sea says her company monitors the large tuna it catches to ensure that they are below FDA limits. So do Bumble Bee, StarKist, Three Diamonds, Pan Pacific, and Neptune, according to Randi Parks Thomas of the Tuna Research Foundation, an industry group.

Nearly three-quarters of the U.S. per capita consumption of commercially harvested fish and shellfish is made up of canned tuna, fish fillets and steaks (mostly cod, flounder, and pollock), fish sticks, and shrimp.[10] None of these is likely to be very contaminated.

The species *most* likely to be contaminated are wild catfish (PCBs and pesticides) and swordfish (mercury). (FDA monitoring has found "farmed" catfish to be far less tainted.) Close seconds are carp (PCBs and pesticides) and shark (mercury).

It's only prudent to minimize your consumption of the species most likely to have the worst contamination problems. Indeed, prudence, not panic, is the appropriate response to the recent spate of bad press about seafood. Consuming contaminated fish is a much smaller risk than, for example, smoking cigarettes, drinking too much alcohol, or not wearing a seatbelt.

In short, don't swear off fish. But do minimize your exposure to contaminants.

How To Improve Seafood Regulation

Better standards, monitoring, and inspection can improve the safety of seafood. Urge your legislators to consider the following recommendations for improving seafood safety:

- Federal and state governments should inspect seafood at least as thoroughly as meat and poultry.

- The FDA's monitoring program for contaminants in seafood should be scientifically designed to provide basic information on how much of which contaminants are in which fish. More samples (especially of imported seafood) should be tested, and testing for more chemicals is needed.

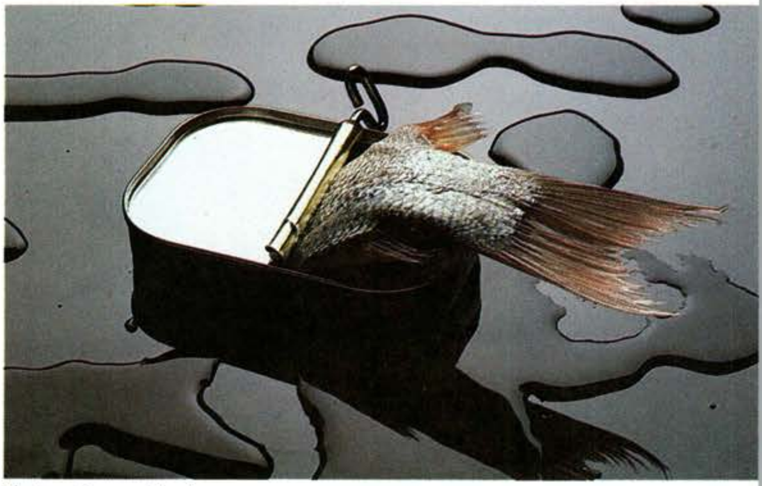
- State-of-the-art risk-assessment techniques should be used to establish legally enforceable limits for all contaminants that pose potential health risks.

- State and local fisheries enforcement agencies need to impose higher fines and employ more people to prevent illegal harvesting of shellfish from polluted areas.

- Improved tests are needed to determine the presence of disease-producing microbes in shellfish waters.

- The federal government needs more rapid testing methods, authority to embargo suspect seafood, and the ability to quickly seize illegal products to protect the public from contaminated seafood.

— Lisa Y. Lefferts



Photos: Image Bank

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[1] National Marine Fisheries Service, *Plan of Operations: NNFF Model Seafood Surveillance Project*, 1989; and *Nat. Food Rev. 11 (4)*: 33, 1988.

[2] *Environ. Sci. Technol. 18*: 628, 1984.

[3] *Devel. Psych. 20*: 523, 1984; and *J. Pediatri.*, Vol. 105: 315, 1984.

[4] *Child. Dev.* 56: 853, 1985.

[5] *N. Eng. J. Med. 319*: 1228, 1988.

[6] National Marine Fisheries Service, *Plan of Operations: NNFF Model Seafood Surveillance Project*, 1989.

[7] *Marine Fish Rev. 46*: 13, 1985; and *Lancet* 1: 161, 1988.

[8] *Am. J. Pub. Health 79*: 322, 1989.

[9] *Environ. Health Perspect. 45*: 171, 1982.

[10] National Marine Fisheries Service, *Fisheries of the U.S., 1986*, 1987.

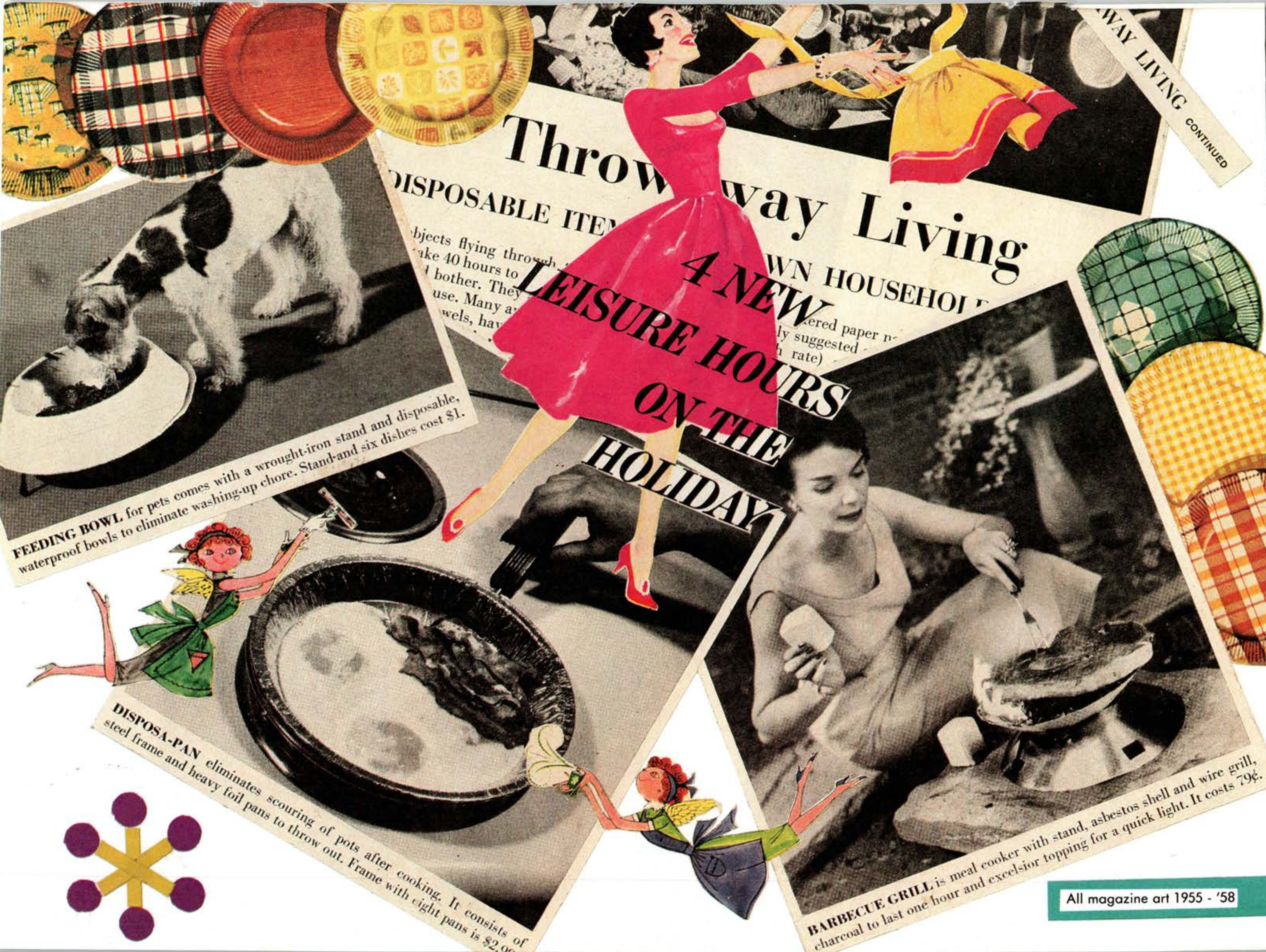
the Disposable Decades

"Yippee!" cheers the gleeful American family pictured in *Life* magazine. "Throwaway Living" is destined to "cut down household chores." The year is 1955, just before the fast-food lifestyle blossomed — which just goes to show that we haven't *always* been a throwaway society.

The great garbage jag began during the economic boom of the post-WW II era. Marketing experts set to work trying new ploys to get Americans to buy and toss, or "stimulate consumption" in economists' talk. In the mid 1950s, marketing consultant Victor Lebow wrote an impassioned plea for "forced consumption" in the New York *Journal of Retailing*. "Our enormously productive economy," he wrote, "demands that we make consumption a way of life, that we convert the buying and use of goods into rituals, that we seek our spiritual satisfactions in consumption . . . . We need things consumed, burned up, worn out, replaced, and discarded at an ever-growing rate."

America caught on quickly. Introduced as a civic responsibility, throwaway living was soon seen as a consumer's right. Today, we throw away more than ever, though we do it more with pangs of guilt than glee.

— *Janet Marinelli*



FEEDING BOWL for pets comes with a wrought-iron stand and disposable, waterproof bowls to eliminate washing-up chore. Stand-and six dishes cost $1.

DISPOSA-PAN eliminates scouring of pots after cooking. It consists of steel frame and heavy foil pans to throw out. Frame with eight pans is $2.0

BARBECUE GRILL is meal cooker with stand, asbestos shell and wire grill, charcoal to last one hour and excelsior topping for a quick light. It costs 79¢.

All magazine art 1955 - '58

GARBAGE AT THE GROCERY

A Guide to Saner Supermarket Shopping

by Janet Marinelli

Remember when smart supermarket shopping meant hunting for the best buys and steering your cart away from products with unpronounceable ingredients? First we stopped trusting our health to a higher authority and became expert label readers for lurking cholesterol and additives. Now, with landfills overflowing and garbage barges with no place to go, we've got to negotiate the supermarket aisles with a sensitivity toward trash.

Not long ago, I was planning a barbecue, so I headed to the food store in search of ketchup, vowing to buy in bulk to cut down on the number of ketchup bottles that might otherwise end up at the dump. All I could find in the jumbo size, alas, was ketchup in some kind of squishy plastic container. After suffering pangs of guilt for grabbing bottled water in jumbo plastic bottles, I turned toward produce, confident that there, at least, I'd be able to find something unprocessed and unpackaged. I walked away with corn on the cob — shrink-wrapped on a plastic tray. And I still hadn't reached the checkout counter, where I'd be confronted with the moral dilemma of plastic vs. paper bags.

The American supermarket has become a cornucopia of packaging, especially plastic packaging. Time to stop trusting "them" to safeguard the environment. Can we individual shoppers do anything about the garbage glut, short of swearing off everything that doesn't grow — unwrapped — in our own gardens? What kind of packaging is benign and what's not? Is plastic the only culprit? Is the temper tantrum for paper bags at the checkout counter worth it? In the interest of smaller landfills (and my own sanity), I decided to find out.

• THE GREAT GARBAGE BINGE

Nobody disputes the magnitude of our garbage problems. Landfills have been the keystone of waste disposal in this country for decades; but according to the Environmental Protection Agency (EPA), more than a third of the nation's municipalities will run out of landfill space in two or three years, half within the next 10 years. When landfills fill up, they must be closed, and that's left local governments scrambling for alternative ways to dispose of trash.

For a while, many local officials flirted with the idea of simply switching to incineration as landfills close. But burning garbage has a history of air-pollution problems, and the romance with incinerators cooled when politicians discovered that none of their constitutents wants one next door.

With landfills and burning in disrepute, there is an emerging consensus among government, industry, and the public which puts recycling close to the top of a hierarchy of trash-disposal options, and considers burning and landfills last resorts. According to this new way of thinking, "source reduction" — producing less trash in the first place — is the way to start dealing with the solid-waste crisis.

There's no way around it: America's great garbage binge must end. Each one of us throws away an estimated 3.5 pounds of trash a day. About 30 percent by weight, and an estimated 50 percent by volume, is packaging. (Food and yard wastes account for most of the rest.) Therefore, packaging is a logical place to start looking for ways to cut down on what we throw away.

Most of the packaging that ends up in our trashcans comes from the supermarket. According to the U.S. Department of Agriculture, we spent $32.3 billion on food packaging in 1988, up from $28 billion in 1986. Last year, eight percent of the amount shoppers spent on food originating in the U.S. paid for packaging, and the cost of packaging was up eight percent from the previous year.

According to the experts, approximately 13 percent by weight, and as much as 30 percent by volume, of the packaging discarded in 1986 was plastic. (These figures seem low to me. In my supermarket, it's hard to find many products that *aren't* packaged in plastic.) According to the Society of the Plastics Industry, 12.7

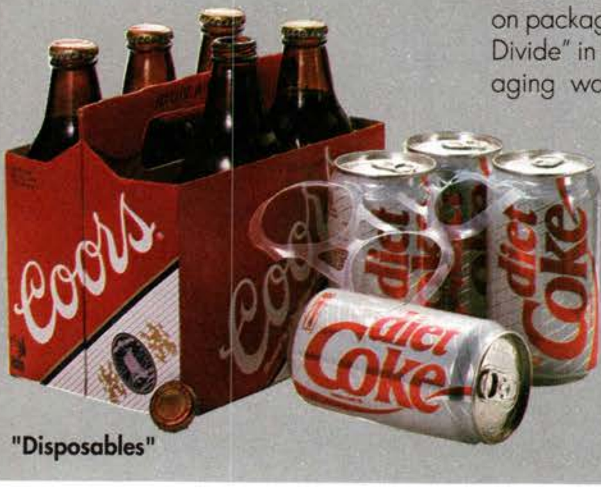
Food-packaging experts cite 1809 as the year when the business of wrapping, containing, and boxing was born. That year, Nicholas Appert, a Frenchman, developed a method of preserving food in glass bottles with cork stoppers.

For more than a century, packages were made of basically natural materials — packages like the glass jar, the paper bag, and the pickle barrel. Aluminum foil was introduced in 1929. Moisture-proof cellophane appeared the same year. Packaging began to be perceived as a field destined to play a major role in America's future.

The Dawn of Disposables

World War II had such a profound impact on packaging, it's been called the "Great Divide" in the trade. Before the war, packaging was strictly utilitarian. Designers studied the relative merits of natural twines like sisal and jute, and salesmen didn't need doctorates in consumer psychology. With GIs spread across the globe, the American military was faced with a seemingly insurmountable set of food storage and distribution problems, and industry rose to the occasion with portion control, vastly improved canning technology, disposable beverage containers, and other innovations.

When the war ended, design and marketing talents set their sights on civilian uses for these wartime inventions. The result was a food-packaging industry that has evolved at a dizzying pace — along with the fast-food restaurant and the self-service supermarket, both of which owe their existence to packaging innovations.



"Disposables"

America's idea of convenience since 1953

Photos by Donald Betts/Horizon Photographics, Inc.

billion pounds of plastic resins were used in 1987 for packaging; that number is expected to almost double in the next 10 years. Much of the growth in plastic packaging has come at the expense of materials like glass and aluminum, which are easily recycled.

• THE PLASTICS FLAP

It's gotten so that walking out of the supermarket with a plastic bag is like announcing to the world that you've committed the ecological equivalent of mortal sin. Plastic bags are made of the black goo that recently fouled the once-pristine Prince William Sound, right? And plastic wrap that ended up at the dump long before we were born will be there long after we've been buried, no? Well . . . yes and no.

In a 160-page study entitled *Wrapped in Plastics*, Jeanne Wirka, coordinator of the Solid Waste Alternatives Project at the Environmental Action Foundation, summarizes the ecological case against plastic packaging: "The plastics revolution in packaging has a dual impact on the environment. Although consumers rarely make the connection between the everyday plastics products and packaging they buy and the growing problem of toxic pollution, many of the chemicals used in the production and processing of plastics are highly toxic . . . . Improper land disposal of hazardous wastes, emissions of toxic chemicals into the air, and discharges of toxic industrial effluents into waterways all threaten public health and the environment at the 'front end' of plastics production. At the 'back end,' post-consumer plastic trash is littering our streets, oceans, and wilderness areas, and contributing to our nation's solid-waste crisis."

One of Wirka's most powerful arguments is that the plastics industry contributes significantly to this country's hazardous waste problems, and that this is a high price to pay for packaging, a product designed to be used once, then thrown away.

In an EPA ranking of the 20 chemicals whose production generates the most hazardous waste, five of the top six are chemicals commonly used in the manufacture of plastics for packaging, including propylene (ranked first), phenol (third), ethylene (fourth), styrene (fifth), and benzene (sixth). Benzene, to take one example, an established human carcinogen implicated in leukemia cases, is used as a solvent in the production of polyvinyl chloride (PVC) and low-density polyethylene (LDPE), and as a raw material for styrene, from which polystyrene (PS) is made. PVC, LDPE, and PS are used widely in the food-packaging industry (see the history of food packaging above).

For every report that makes plastic packaging look like a villain, the industry points to another extolling its virtues. A study recently released by the National Association for Plastic Container Recovery, a plastics industry group, indicates that compared to glass and aluminum, PET, the plastic used for beverage bottles, is more energy efficient and creates less pollution. The study took into account all energy consumed and all wastes produced, from extraction of raw materials, to manufacturing, filling, and shipping, to disposal of the containers after they're used, both at current and projected recycling rates.

The arguments for and against plastics are enough to make your head spin:

✱ Opponents of plastic packaging estimate that as many as a million seabirds and 100,000 marine mammals die each year after ingesting or becoming entangled in plastic debris. They make their point with heart-wrenching photos of seals choking to death on plastic six-pack yokes.

The plastics establishment, meanwhile, publishes essays implying that plastic packaging can save human lives. A recent article in *Modern Plastics* magazine (one of a continuing series entitled "Plastics: The Solution — Not the Problem") contends that the amount of food that plastic packaging could save from spoilage alone makes it an important weapon in the battle against hunger worldwide.

The idea was to sell "convenience" to prosperous post-war consumers. The first successful TV dinner (Swanson's turkey, mashed potatoes, and peas) appeared in 1953. (Microwavable foods are the most recent variation on the theme — see page 64.) Disposable beverage containers took over entire supermarket aisles. Close on their heels came the pop-top can and the twist-off cap.

The Plastics Revolution

The 1940s were also the "Golden Age" of plastics, and the war spawned dozens of new uses, from nylon parachutes to acrylic bomber nose cones. It wasn't long before polyethylene, polyvinyl chloride, polystyrene, and other plastic polymers appeared in new guises at the supermarket.

Polyvinyl Chloride
PVC

PVC was introduced in 1927. Today, virtually all packaged meat is wrapped in PVC, which keeps the meat from turning brown. PVC is also made into bottles used to package cooking oils and a variety of non-food products.

PVC food packaging has been the subject of controversy since 1973, when vinyl chloride, a carcinogen, was found to be leaching into liquor sold in PVC bottles. The industry has since submitted data showing that the levels of vinyl chloride in PVC have been reduced. The matter is under review by both the federal Food and Drug Administration and the Environmental Protection Agency.

Polystyrene
PS

Introduced in 1938, PS is the stuff of which disposable dishes, cups, and bowls are

✱ The popular argument against plastic is that it's not biodegradable, so the stuff in landfills is likely to be around for decades, perhaps centuries. However, after digging around at old dumps in various regions of the country, Dr. William Rathje, a professor of anthropology who heads the University of Arizona at Tucson's Garbage Project, has found perfectly readable newspapers at least 30 years old, not to mention perfectly preserved grass clippings, hot dogs, and T-bone steaks. In other words, paper and other "organic" materials don't biodegrade quickly in landfills, either.

✱ Only their manufacturers believe that the much publicized new plastics, which are supposed to biodegrade (break down when exposed to microbes) or photodegrade (break down when exposed to light) can put a dent in landfills. Packagers worry that degradable packaging might break down prematurely, shortening shelf life. Environmentalists point out that even if degradable plastics worked (they haven't been around long enough to tell), they preclude recycling, and therefore do nothing to conserve resources and reduce toxic manufacturing wastes.

✱ Used to be, one of the best arguments against plastics was that they can't be recycled. In the past few years, the industry has begun to prove at least some of them can. One percent of the plastic used in this country was recycled last year — a recycling rate much ballyhooed by the industry, but far behind the rates for aluminum, glass, and paper, environmentalists are quick to note.

In a recent ad, Mobil, one of the major players in the plastics business, compared the industry to "the 20-year-old job applicant who is told she needs 25 years of experience." For an industry whose entire history can be measured in microseconds compared to paper (first processed in ancient China) and glass (traced back to the ancient Egyptians), said Mobil, its recycling record isn't all that bad.

Environmentalists counter this "new kid on the block" defense by arguing that plastics are not truly recycled, since new packages are not made from old containers in a "closed-loop" process. Old glass, for example, can be used to make new bottles an infinite number of times. But PET plastic bottles are turned into secondary products like fiberfill stuffing and scouring pads. One reason is that, in order to minimize their legal liability, manufacturers would have to demonstrate to the federal Food and Drug Administration that recycled plastic food containers are free of contaminants — no easy task, since they're dealing with material pulled out of the waste stream. What's more, no one has demonstrated that it's possible to recycle the scouring pads and the other recycled plastic products once they're discarded.

Since old plastic is not turned back into food packaging, more virgin resins must be used to make new packages. This is one of the most convincing arguments against the frivolous use of plastics in packaging. In the dozen or so years since the last energy crisis, we seem to have forgotten that petroleum and natural gas, the raw materials of plastics, are precious resources that will run out some day. Why waste them on products destined to be trashed by consumers in a matter of minutes?

The plastics industry is at its most persuasive when it cites ways in which some of its packaging products are better. "In the home, break-resistant, shatterproof, and no-spill plastic bottles cut down on injuries and clean-ups in the kitchen, bath, and garage," notes "Plastics in Packaging: Performance All Wrapped Up," a Society of the Plastics Industry pamphlet. The pamphlet makes the point that plastic containers, lightweight and molded to promote easy handling, make it easier for consumers to buy in bulk (something I've never complained about while lugging two-liter beverage bottles home from food stores).

made. PS, better known by Dow's tradename Styrofoam™, is best known as the fast-food "clamshell" hamburger container. It has also virtually replaced paper for egg cartons and meat trays.

This plastic has also been the center of controversy, since the chlorofluorocarbons (CFCs) used in the "foaming" of some forms of PS have been linked to the destruction of the protective ozone layer in the upper atmosphere. Responding to consumer pressure, the 15 manufacturers that used CFCs in their food packaging phased out their use at the end of last year.

Yet another PS to recently hit supermarkets and fast-food outlets is the clear clamshell made of oriented polystyrene (OPS). Thanks to the boom in take-out salads and the popularity of prepackaged produce, deli entrees, and baked goods, OPS sales in 1987 jumped 33 percent.

Low-Density Polyethylene
LDPE

LDPE was introduced during World War II; by the 1960s it replaced cellophane as the favorite food wrap; today, more LDPE is used in packaging than any other plastic. Most is still used for clear wraps and bags, including supermarket produce bags, bread bags, and garment bags. It's also used as a coating on other packaging materials — the familiar paperboard milk carton, for example — and in squeezable bottles for flexibility.

LDPE

HDPE

High-Density Polyethylene
HDPE

HDPE is opaque, and has more tensile strength than LDPE. Introduced in 1957, it debuted as a plastic milk bottle in 1966 at

The industry is on shakier ground when it claims that we pampered consumers are the ones who asked for plastic bags, and foods packaged in plastic that can go from freezer to oven to table in record time, without being touched by human hands. The truth of the matter is, we got plastic packages because (like the plastic grocery bag) they often cost grocers less than, say, paper. And we got them because in the competitive world of food retailing, grocers find it hard to resist clever marketing gimmicks.

• REJECT, REUSE, RECYCLE

We may not have asked for these products, but a lot of us have gotten used to them. So if we're serious about doing something about the garbage problem, we have to change the way we shop.

For starters, we can *reject* overpackaged products — no matter what the packaging is made of. Life without corn on the cob in shrink-wrapped cardboard or plastic trays shouldn't be too difficult. Buying in bulk can save on packaging — and save you money. Conversely, doing without products sold in single servings can cut down on waste. The single-serving concept established a foothold in restaurants, cafeterias, and hospitals; today, it's a hot item in supermarkets, from tiny cans of tuna to portion-controlled pet food. In addition, food-industry claims to the contrary, minimizing consumption of overpackaged ready-made, frozen, and microwavable foods probably won't cause an existential crisis for most of us.

Refillable containers can be *reused* scores of times. Since sterilizing and refilling require much less energy than reprocessing a package, refillable bottles are less wasteful than even those that can be recycled. Clinking milk bottles in the wee hours of the morning may be a thing of the past. But remember, too, when trips to the local beverage distributor to drop off and pick up refillable beer and soft-drink bottles were standard household practice? Most neighborhoods still have beverage distributors, if not milkmen, and they usually will even deliver.

And why waste time arguing the merits of paper over plastic bags when, most of the time, bringing a reusable tote bag to the market would be no major inconvenience?

Another good rule of thumb for food shoppers: *Recycle* as much food packaging as possible. Try to buy only products in containers that are being collected for recycling in your neighborhood. Almost all communities with mandatory recycling programs collect aluminum and glass, and these materials are also accepted by most private or volunteer recycling centers. From foil trays to the common beverage can, aluminum is the most valuable of all recyclable materials. Steel cans used for fruits, vegetables, juices, and pet foods are also widely recycled. About 20 percent of PET plastic beverage bottles were recycled last year, thanks to the container-deposit laws in effect in a number of states, which make them accessible to reprocessors. A few communities in states without bottle laws also collect PET bottles, and less often high-density polyethylene (HDPE) bottles (used for milk, liquid detergents, and bleach) as well. To find out what's being recycled in your area, call your local sanitation department or recycling center.

The small but promising efforts to collect plastics for recycling may come to naught if manufacturers continue to blithely introduce complicated multi-materials packages. From juice boxes to squeezable bottles, they're another hot item on supermarket shelves. A handful of facilities are making plastic lumber using mixed recycled plastics (known as commingled plastics in the solid-waste business). However, since most recycling technologies require that plastics be segregated according to type, or resin

Heatherwood Dairy in Lansing, Michigan. HDPE is the polymer used for the first plastic "tub" for butter and margarine, which appeared on supermarket shelves in the early 1970s. It's now used widely to bottle bleach and detergent, milk, and orange juice in gallons, as containers for ice cream, cosmetics, and medicine, and for grocery and other merchandise bags and heavy-duty trash bags.

PP

Polypropylene PP

The first PP tub for butter or margarine was introduced in 1980. PP's other packaging applications include syrup bottles, yogurt containers, containers for some detergents, shampoos, and medicines, and screw-on caps and lids. There's also a good chance that your drinking straw, the liner of your cereal box, and the label of your soft-drink bottle are made of PP.

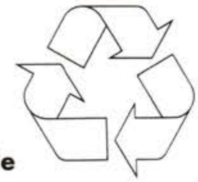
Polyethylene Terephthalate PET

Except for polystyrene, this is probably the most familiar plastic. It's also the most dramatic example of a plastic's impact on a packaging market. PET has captured 100 percent of the two-liter beverage bottle market since its debut in 1978, and it's doing quite well in the one-half-, one-, and three-liter bottle markets. Because of its ability to withstand heat, PET is widely

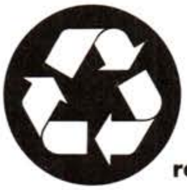
PET

— PET, HDPE, and so on — multi-plastic packages like squeezable bottles almost invariably end up at the dump. Shoppers should avoid them.

Buying products in recycled containers is another way to demonstrate your support for recycling. One-half of the paperboard boxes for cereals, detergents, pasta, and cake mixes are made of recycled material, according to the American Paper Institute. They can be identified by their grey (not white) interior, and often the recycling symbol is displayed on the box (see the illustrations below).



recyclable



recycled

The trend toward recycled materials is beginning to affect other packaging markets, too. Procter & Gamble is selling Spic 'n Span cleaner in 15-ounce bottles made of 100 percent recycled PET on the West Coast, and plans to go nationwide with its recycled container as soon as production capacity permits.

• GIVE US A BREAK

Food shopping has gotten mighty complicated. I've been writing about garbage for more than a decade, and it took me three weeks of research to be able to tell the difference between polypropylene and polyethylene. How can a harried shopper be expected to invest that much time in supermarket shopping? Ultimately, it's up to the industry to provide us with sound packaging choices — and up to government regulators to make sure that they do.

In future issues, we'll tell you more about the range of initiatives — from packaging taxes to packaging bans — being tried by local officials desperate to reduce the amount of trash they must dispose of. But consider, for example, the ordinance recently adopted in Minneapolis. It would permit certain types of packaging only if the city can work out an acceptable recycling program. Since plastics are not among the materials currently accepted by the city's curbside collection program, plastic packaging is effectively precluded. Legislation to establish a graded tax on all packaging materials has been introduced in Massachusetts and New York. A packaging board would determine taxes and exemptions for different containers based on reusability, recyclability, and recycled content. The idea is to make the price of a product reflect the costs of disposal.

Local officials are also hoping that public education can help spur us to throw away less. But the individual consumer can do only so much and, ultimately, the most important target for source reduction is the "source" of the problem — the packaging industry itself. Surely an industry ingenious enough to invent the squeezable bottle can design packaging that's environmentally sound! Here are a few modest proposals for all you packaging designers out there:

You have to be a PhD in the polymer sciences to make sense of the plastic packaging in supermarkets these days. A plastic identification system on labels would make life easier for all of us. (Symbols have recently been introduced by the Society of the Plastics Industry, but they may be misleading. See page 14.)

That's just for starters. It would be even simpler if we frazzled consumers never had to think about whether a particular food packaging is an unrecyclable mishmash of materials. Give us a break and give us single-material packages, whether alumiused for frozen food boil-in-bag pouches, as well as "dual ovenable" trays for frozen foods that can be heated in microwave or conventional ovens. PET is also used to package items from salad dressings to peanut butters, mustards to mouthwashes.

High-Tech Packages

Just when you thought you had a handle on PET bottles and PP tubs, the next wave of packaging arrived.

Aseptic packages, made of aluminum foil laminated with plastics, won the FDA's approval a few short years ago. Yet already, more than a billion little, rectangular cartons for juices and other drinks (known as "brick paks" in trade talk) are sold yearly, according to *Progressive Grocer*. Applications seem destined to increase. Puddings and applesauce are already being marketed in aseptically packaged cups, in disposable, single servings for pampered consumers.

Aseptic packages

Multi-resin (multi-plastic) containers are another recent development. These packages consist of several layers of plastic. One layer may provide strength; another, prevent punctures; still another, protect the taste, texture, and flavor of the food and prolong shelf life. Each package consists of as many as 10 different layers. The 28-ounce squeezable Heinz ketchup bottle is the most notable example. According to the Society of the Plastics Industry, after introducing this product in 1983, Heinz picked up several points of market share.

To the grocer's delight, these products can be premium priced because consumers are willing to pay for the added convenience. Needless to say, the technology was quick to spread from the ketchup line; there are now squeezable bottles for mayonnaise, barbecue sauce, jelly, jam, margarine . . . .

Squeezable bottles

num or PET, that are easily recycled into new packages.

Even better, why not reinvent the refillable container? Traditional wine and beer bottles differ only by their paper label. The concept could be extended to fruit juices, milk, liquor, and soft drinks as well. Such standardized containers could be used interchangeably by different food producers. Impossible in a complex consumer culture like ours, you say? Well, Norway and Denmark, countries with two of the world's highest standards of living, allow fewer than 20 types of returnable containers for beer and carbonated beverages on the market.

And it seems to me the time is ripe to bring back packages that serve a useful purpose once their life as packaging is over — like the jelly jars that doubled as the Flintstone glasses I loved so much as a kid. (The fast-food industry already does this on a limited scale with Ronald McDonald glasses and the like.)

Recycled cereal boxes and Spic 'n Span containers are cause for optimism. But packaging is a profitable business, one unlikely to change unless change is clearly in its financial interests. All the more reason for us supermarket shoppers to make the right choices and keep on the pressure!

For more information:

Jeanne Wirka of the Environmental Action Foundation can keep you abreast of government initiatives to deal with the garbage crisis. Contact her at the Solid Waste Alternatives Project, Environmental Action Foundation, 1525 New Hampshire Ave., N.W., Washington, D.C. 20036; (202) 745-4870.

The Coalition for Recyclable Waste publishes a newsletter on food packaging and other solid-waste issues. The coalition also sells a reusable grocery bag made of canvas. Write P.O. Box 1091, Absecon, NJ 08201.

PACKAGING MATERIALS IN MUNICIPAL SOLID WASTE

Percentages by Weight, 1986*

Paper **48%**	**Plastics** **13%**	**Misc.** **5%**
Glass **25%**	**Steel** **6%**	**Aluminum** **2%**

* Percentages based on the volume of materials discarded would be a more accurate indication of the amount of packaging material that ends up in landfills, but these figures are not generally available. It's estimated, for example, that plastic packaging is as much as 30 percent by volume of total packaging in municipal solid waste, but only 13 percent by weight. These figures also represent the amount of trash *after* materials were removed for recycling.

PACKAGING THAT'S RECYCLED*

Aluminum — 47%

PET beverage bottles — 17%

Steel cans — 15%

Glass — 11%

* National figures from 1986

Source: Garbage staff research

NATURAL PEST CONTROLS

Concern over the health effects of synthetic pesticides has led many gardeners to natural pest control products, which generally do less ecological damage. Natural pesticides, however, may be more toxic than you think.

BY CHERYL BEST

Used to be, home gardeners had a simple choice. They could employ the barrage of pesticides on the shelves of local garden centers. Or they could opt for a chemical-free garden and hope for the best.

Since only a few natural pest controls were widely available, early organic gardeners often fought an uphill battle against the endless onslaught of insects, weeds, and diseases. Many invented their own concoctions, stuffing every herb and natural substance they could think of into the blender, then spraying it on offending pests. Gardeners with stronger stomachs (and extra blenders) often mixed up slurries of the invading insects in hopes of frightening off other unwelcome visitors. The effectiveness of these home-brewed pest controls was limited at best.

Nineteen seventy-six marked a turning point for gardeners. That year, at an international conference on entomology, the era of Integrated Pest Management was officially proclaimed. Integrated Pest Management, or IPM, considers the entire garden ecosystem to determine the best methods for controlling pests. Proper cultivation practices, the relation between pests and their predators, and other common-sense techniques are used to suppress pest populations. Toxic controls are employed selectively, and only after careful monitoring to determine whether pests are present in numbers large enough to damage the crop.

IPM was quite a radical departure from standard agricultural practice of the 1950s, '60s, and '70s, which was based on regularly scheduled applications of pesticides (known in the trade as calendar applications) to prevent the invasion of pests anticipated each season. Since pest populations change and can move on from year to year, calendar applications are often unnecessary, kill beneficial insects unnecessarily, and add unwanted pesticide residues to produce. Originally developed for commercial agriculture, IPM has spilled over into home gardening.

In fact, we've come so far in the past 13 years that a plethora of natural pest-control products for the home gardener is now available. The names of the larger companies specializing in these natural gardening products — Safer and Ringer are two of the best known — are now household words, at least among gardeners who prefer an organic approach. For the past few years, some of the products of these larger companies have been for sale at hardware stores and nurseries. But the widest choice is still available only through mail-order catalogs. (See page 47 for a list of suppliers.) Many of these mail-order sources deal exclusively in natural gardening products; others are familiar, all-purpose gardening suppliers which in increasing numbers are beginning to feature a few natural pest controls in their catalogs.

Why is the marketing of organic gardening suddenly so hot?

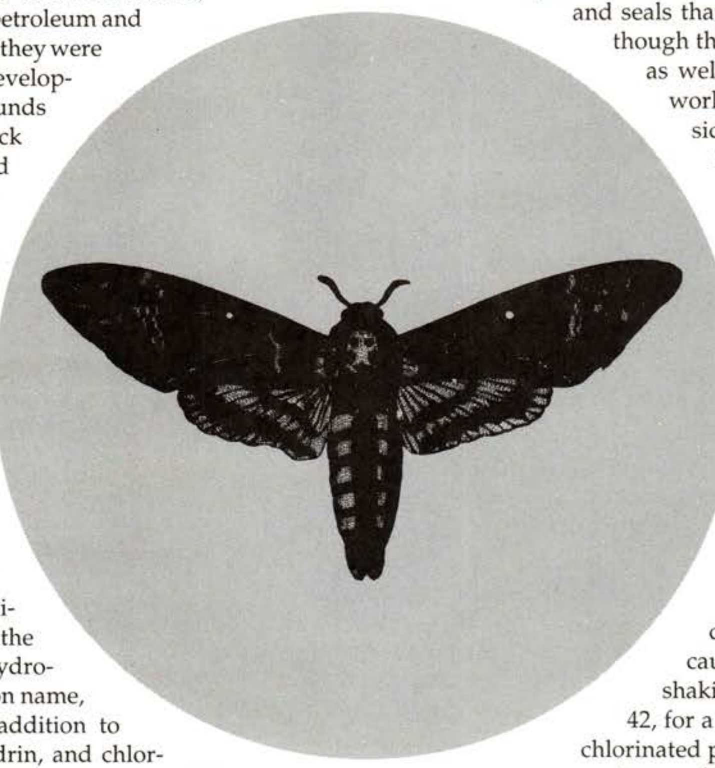
***Cheryl Best** is a Cornell University Cooperative Extension Associate with the New York City Urban Horticulture program.*

How do natural pest controls work? And are they really safer than synthetic pesticides?

• A SHORT HISTORY OF PESTICIDES

Natural pest controls are nothing new. In ancient China, predatory ants were released on trees to protect them from destructive pests. Pyrethrum, a pesticide extracted from the flowers of a type of chrysanthemum and still used widely today, was first used in Persia in the early-19th century. Rotenone, another pesticide derived from plants, came into widespread use about 50 years ago, when federal legislation to limit pesticide residues on crops was passed.

It wasn't until after the Second World War that DDT, which had been used so successfully by the military to exterminate body lice and malaria-bearing mosquitoes, became the first widely used synthetic pesticide, ushering in the era of unquestioned reliance on petrochemical compounds. DDT and other synthetic pesticides were considered modern miracles, and as they were derived from petroleum and oil was both plentiful and cheap, they were inexpensive to produce. The development of these synthetic compounds put natural controls on the back burner and radically transformed the agricultural industry's thinking about eradicating pests.



The era of optimism over petrochemical pesticides was relatively short-lived. In 1962 in *Silent Spring*, Rachel Carson began calling public attention to the ecological problems of chemical pesticides. By then, DDT and other chlorinated pesticides, or organochlorines, were among the world's most widely distributed synthetic chemicals. Organochlorines are a class of chemical compounds produced by the addition of chlorine atoms to hydrocarbons; hence the more common name, chlorinated hydrocarbons. In addition to DDT, they include aldrin, dieldrin, and chlordane, all used to kill termites until 1984, when an emergency ban was put on their use.

Other chlorinated pesticides are still used today, and a few are available to homeowners. The main advantage of the organochlorines is their residual effectiveness, the specialist's term for a pesticide's ability to persist in its active toxic form for a relatively long time, continuing all the while to attack pests.

Residual effectiveness varies from chemical to chemical, even within the same class. The chlorinated pesticides available to homeowners for edible crops do not have as high a residual effectiveness as the banned compounds, yet they still persist longer than many classes of pesticides. Kelthane (dicofol), for example, has an approximate residual effectiveness of two weeks on plants. Methoxychlor lasts several weeks on plant surfaces and lasts an entire season in soil and water. The higher the residual effectiveness of a pesticide, the more environmental damage it's likely to wreak.

Chlorinated pesticides are nerve poisons. They disrupt the function of the nervous system, mainly the brain, but their exact mode of action is unknown. For years, the public assumed that insecticides are toxic only to insects. However, many are toxic to a broad spectrum of living organisms, from amphibians and fish to birds and mammals.

The original chlorinated hydrocarbons, like DDT, were extremely stable in the environment, and highly soluble in lipids (fats). Once released into the environment, DDT "flowed" easily from the nonbiological, like air and water, to the biological, like birds and mammals. What's more, once these compounds were absorbed by living organisms, they were magnified in the food chain: As higher members of the food chain ate contaminated lower members, the food was digested, metabolized, and excreted — but much of the insecticide was retained. As more contaminated food was ingested, the pesticides began to accumulate, with some devastating effects.

As DDT accumulated in their tissues and thinned the shells of their eggs, causing reproductive failure, populations of ospreys, eagles, and other birds relatively high on the food chain plummeted. DDT residues have been found in birds and seals that never leave the Antarctic, even though the pesticide was never used there, as well as in most animals around the world, including humans. DDT is considered a probable carcinogen in humans, because in lab tests it has caused cancer in at least two animal species. DDT was banned in this country in 1972.

Research done on the chlorinated pesticides available today indicates that they are unlikely to be magnified in the food chain. However, it is known that all chlorinated pesticides or their breakdown products can be stored in human tissues as a result of a single large (acute) dose, or repeated small (chronic) exposures. Chronic exposure via skin contact, inhalation, or ingestion can cause nervousness, weakness, and shaking. See "Rating Cancer Risks," page 42, for a discussion of the oncogenicity of chlorinated pesticides.

A second class of synthetic pesticides, the organophosphates, came into commercial production in the 1950s. They're now one of the largest groups of pesticides in use, and include malathion, diazinon, chlorpyrifos, and acephate, to name just a few readily available to home gardeners. Each of these pesticides is effective against a wide variety of insects.

Organophosphorus compounds differ from one another in many important respects. Although chemically they can all be considered derivatives of phosphoric or triphosphoric acids, they vary widely in their ability to penetrate the skin (the most common means of pesticide overexposure), as well as in their levels of toxicity. At one end of the spectrum is the highly poisonous insecticide parathion. At the other end is malathion, one of the most widely used chemicals by home gardeners, which is less acutely toxic than many of the pesticides derived from natural sources. Organophosphates also vary in their persistence in the environment, but they're generally less residually effective than the organochlorines.

Organophosphates poison by inhibiting cholinesterase, an

Rating Cancer Risks

When you think about the health effects of exposure to chemical pesticides, cancer is probably at the top of your list. Unfortunately, there is no simple test that can determine definitively whether a pesticide does or doesn't cause cancer in humans. Even scientists disagree on whether individual pesticides are cancer causers.

Pesticides are rated for carcinogenicity (the capacity to cause cancer) by the Environmental Protection Agency. The EPA's ratings are based on years of long-term animal studies done by pesticide manufacturers. Once the test data is submitted to the EPA, it is reviewed by a committee of scientists who then vote on the product's carcinogenicity rating. This is a complex task, because data on animals must be extrapolated to determine cancer risk to humans over a long period of exposure. The committee members do not always agree unanimously on the rating of a particular chemical. The final decision is made by majority vote.

Rotenone is one pesticide on whose carcinogenicity rating committee members could not reach a consensus. Feeding studies did produce tumors in rats. However, the majority ruled that rotenone is unlikely to cause cancer in humans.

Home gardeners should also be aware of the fact that the EPA has not officially evaluated carcinogenicity of many widely available pesticides. Only rotenone and two of the other pesticides listed on the chart on pages 48 and 49 have been evaluated for potential carcinogenicity by the agency. These are propoxur and benomyl, which are rated as probable and possible carcinogens, respectively.

Data on carcinogenicity does exist outside the EPA, however. The National Coalition Against the Misuse of Pesticides (NCAMP), for example, considers a number of other pesticides commonly used by homeowners to be cancer risks. After extensive review of EPA data, epidemiological studies, and the general literature on pesticides, Diane Baxter, staff toxicologist at NCAMP, has concluded that dicofol, benomyl, and 2,4-D are human carcinogens, and that malathion and glyphosate are possible carcinogens. The pesticides on our chart which Baxter's findings indicate are not carcinogenic are chlorpyrifos, carbaryl, and rotenone — although they may have other adverse health effects. (Information on the other listed pesticides was not available.)

Baxter believes that the EPA's review process is fundamentally flawed, in part because the agency depends primarily on the data collected by pesticide manufacturers.

— Cheryl Best

enzyme in many tissues of the body, including blood. Cholinesterase is responsible for stopping nerve impulses once they have crossed the synapses between nerve cells and the organs they affect. In the absence of cholinesterase, nerve cells throughout the insect continue to "fire" until the organism is essentially "burnt out." In humans, exposure also causes a reduction in cholinesterase, resulting in headache, dizziness, weakness, nausea, sweating, and other symptoms. Massive exposure produces more serious symptoms. There's some controversy over the cancer risk of particular organophosphates. See "Rating Cancer Risks," above.

Later in the 1950s, another group of pesticides, the carbamates, was developed. They include such well known insecticides as carbaryl (Sevin), Baygon, and aldicarb (Temik), which was recently banned for use on Long Island, New York because it contaminated groundwater there.

Like organophosphates, carbamates vary widely in toxicity and environmental persistence. Aldicarb, for example, is extremely toxic both when ingested orally and when absorbed through the skin. It is also quite persistent in the environment, hence its ability to contaminate groundwater. Carbaryl, on the other hand, has low toxicity and is not readily absorbed through the skin, although it is extremely toxic to honeybees and should never be used when they are pollinating nearby plants.

Carbamates are also similar to organophosphates in their mode of action. They, too, are cholinesterase inhibitors, but because carbamates are broken down in the body more rapidly, they're called "reversible cholinesterase inhibitors." The symptoms of overexposure are similar to those of organophosphate pesticides but don't last as long; cholinesterase recovery may take from several hours to several weeks, depending on the degree of exposure. Also, the dose necessary to cause incapacitating symptoms is generally far from the lethal dose, whereas the two doses are often dangerously close for organophosphates. But some carbamates are potential carcinogens. (See "Rating Cancer Risks," above.)

The development of pesticides didn't stop with carbamates. In the 1960s, there was a trend toward more specialized pesticides, and new pesticides are still being developed each year.

What hasn't abated is the public's concern over the unanswered safety questions about pesticides, especially pesticide residues in food. According to a Newsweek/Gallup poll, 73 percent of Americans think we should use fewer pesticides and chemicals to ensure safer food, even if it means higher prices. Eighty-four percent of those polled by Louis Harris for *Organic Gardening* magazine said they'd buy produce grown organically if given the chance.

And the public's concern has had a real impact on the pesticide industry. Increased pressure on legislators has prompted more and more stringent regulations — and the pressure continues. It now costs approximately $20 to $44 million to develop a new pesticide, and there's always the chance that it will be pulled off the shelves after coming to market. More companies are now devoting a portion of their research and development dollars to

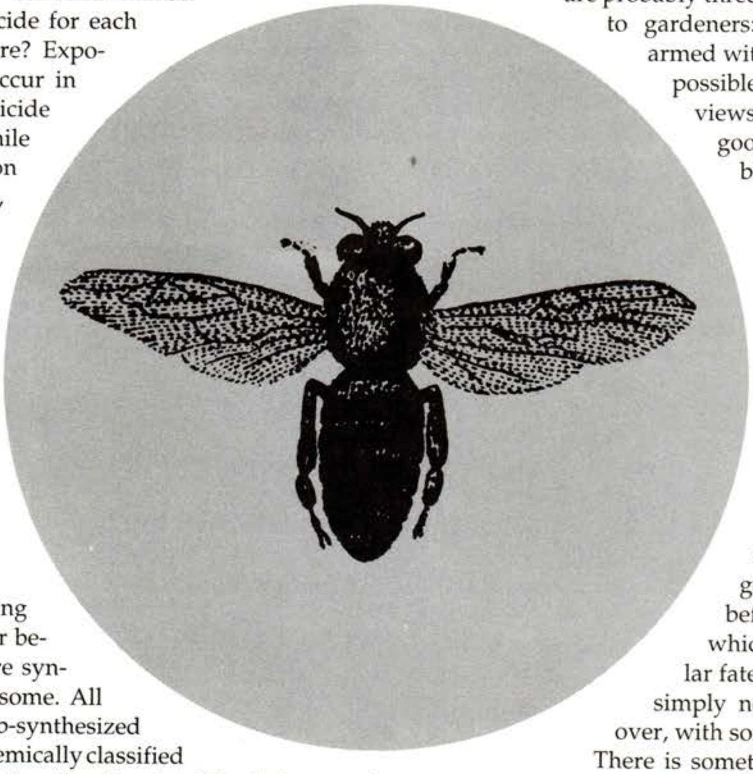
IPM approaches, many of which require less testing and are therefore less expensive to develop. The industry has realized that the market for natural pest controls is (pardon the pun) ripe for the picking.

• NATURAL CONTROLS

Safety appears to be the chief reason behind the growing market for natural pest controls, including pesticides derived from plants. So the logical question is just how safe are they?

To answer this question, it's necessary to define the word "safe." One aspect of safety to consider concerns a pest control's potential impact on the environment. Does it pollute groundwater supplies? Does it contaminate the soil? How long does it persist in the environment, and is it magnified in the food chain? Will it injure or kill fish, birds, mammals, beneficial insects, or other non-target organisms? Is it phytotoxic (meaning will it damage the plant's foliage)? Much, although not all, of this information is available on product labels.

The other issue of safety concerns human health. How toxic is the pesticide for each route of potential overexposure? Exposure to most pesticides can occur in three ways: dermally (the pesticide falls on your skin and scalp while you're applying it), by inhalation (you breathe in the fumes or, more commonly, the particles of pesticides sold as dusts), and orally (you accidentally ingest the pesticide). Dermal exposure is most common; oral exposure is the least common means of exposure for adults but more common among children. In short, the question about natural pesticides isn't are they safer, but rather in which ways and to whom are they safer?



The next step in assessing safety is debunking the popular belief that organic and natural are synonymous with safe and wholesome. All carbon compounds, including lab-synthesized petrochemical pesticides, are chemically classified as "organic." The word "natural," on the other hand, includes only compounds and products derived or extracted directly from natural sources — plants, animals, bacteria, viruses, fungi, rock minerals, and so on. But this alone is no guarantee of safety. According to Paul Schroeder of the Environmental Protection Agency, Pesticide Division, EPA doesn't allow the use of the word natural on new product labels because it sends such a misleading message to consumers. Many of the most poisonous chemicals known occur naturally. So when you choose a pest control, always concentrate on the product's active ingredients (which by law must be listed on any pesticide label) and how they work, not on marketing claims.

Natural pest-control products fall into four broad categories, according to the way they work: cultural, mechanical, chemical, and biological.

Cultural Controls

These are products associated with the care or culture of a garden — natural fertilizers like manure, fish emulsion, and seaweed; organic matter; bacteria which help decompose vegetable matter; compost activators, or the microorganisms responsible for decaying the organic matter in compost piles; and so on. Strictly speaking, these products aren't pesticides because they're not specifically aimed at killing or repelling pests. They merely enhance your garden environment to ensure healthy plants. But good garden culture is considered a pest-control strategy because it's been proven that healthier plants are less susceptible to insects and diseases.

The cultural control products available today are completely safe. The question to ask is do they work?

Since cultural controls are not technically considered pesticides, they're not regulated as strictly. Manufacturers can make claims that aren't backed up by the rigorous testing EPA requires for pesticides. According to Dr. Norman Hummel, assistant professor in the Department of Floriculture and Ornamental Horticulture at Cornell University, "Some legitimate natural organic products are on the market, but for every good one there are probably three or four snake oils." His advice to gardeners: Choose products carefully, armed with as much information as possible from friends and product reviews. "If the product sounds too good to be true," he says, "it probably is."

If you buy a soil enhancer whose manufacturer claims can "bring your soil back to life," or a compost activator claiming it can "turn your pile into compost twice as fast," you may be paying dearly for the same microorganisms found in a shovelful of healthy soil. They're just packaged in concentrated form. If these naturally occuring organisms are missing from your soil, investigate the cause of their demise before adding packaged ones, which may otherwise suffer a similar fate. Many underproductive soils simply need to be aerated, or turned over, with some added organic matter.

There is something to be said for the many natural organic fertilizers now on the market. Although all fertilizers, natural or petrochemical, break down into the same chemical form before they can be absorbed by plants, only those of natural origin add valuable organic matter to the soil.

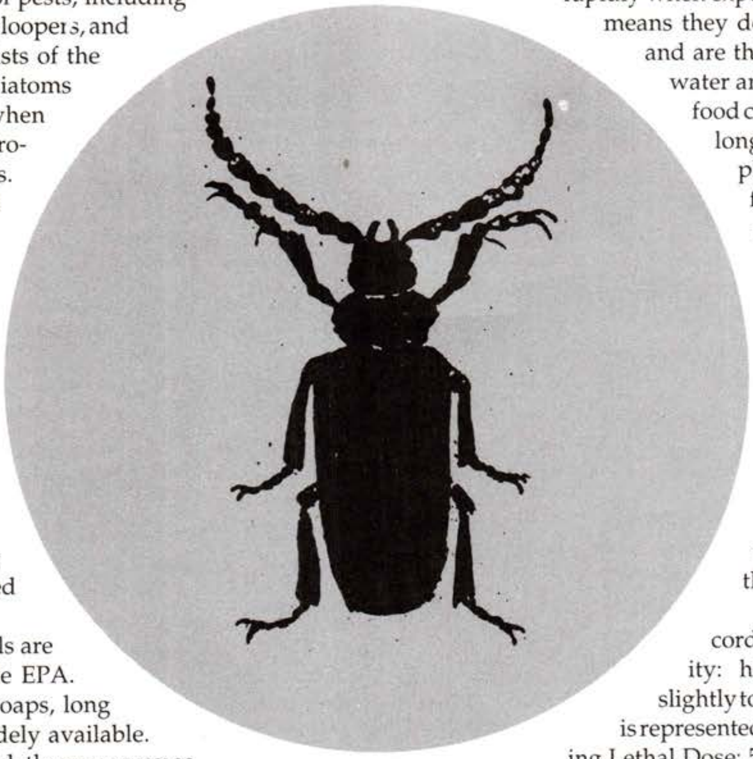
As organic matter decays, it adds humus and micronutrients to the soil. The more humus a soil contains, the more able it is to support plant life. It's impossible to have too much humus in a soil, and it should be added regularly. Organic matter also increases the air space in soils, helping dry, sandy soil retain water and nutrients, and heavy wet soils to drain better. Soils fed only with synthetic fertilizers and no organic matter eventually dry up and crack or blow away. This was in part the cause of the dust bowl of the 1930s.

Mechanical Controls

These are the next line of defense in the battle against bugs. Mechanical controls act as physical barriers or deterrents to pests. Many have been used by gardeners for centuries with no deleterious environmental or health effects. Netting to deter birds; row covers or cheesecloth to keep leaf sucking, chewing, and mining insects from getting to crops; chicken-wire cages to deter deer or small mammals; beer baits for slugs; aluminum mulch for aphids; plastic and fabric mulches to deter weeds; collars to keep away slugs or cutworms; even a jet stream of water to wash insects off plants — they're all mechanical controls.

Traps are another type of mechanical control. The ones that work as simple snares are best for home gardens. One example is a board or card painted yellow to attract whiteflies, aphids, and other small, flying insects. The board or card is coated with a sticky substance, often tanglefoot, which traps the insects. This kind of trap is available ready-made in some nurseries and from mail-order suppliers. Similarly, red balls coated with tanglefoot are commonly hung in orchards to trap apple maggots. The "bag-a-bug" type of trap used for Japanese beetles attracts insects with sex hormones, or pheromones. These traps attract more insects to your property than they can control. They're best used for monitoring local insect populations, not controlling them.

Diatomaceous earth (DE) is used by many gardeners to control a wide variety of pests, including slugs, beetles, aphids, cabbage loopers, and tomato hornworms. DE consists of the skeletal remains of marine diatoms and some algae, which when ground up form a dust of microscopic, razor-sharp particles. When insects crawl through this dust, the particles rupture their body's protective waxy coating. The insects lose body water, dehydrate, and die. DE can kill beneficial insects as well as pests. So if you're trying to nurture beneficial insects as a means of pest control in your garden, use this product selectively! You should also wear a mask when applying the dust, as it's easily inhaled and may irritate your lungs.



A few mechanical controls are regulated as pesticides by the EPA. One example is insecticidal soaps, long used for pest control and widely available. Insecticidal soaps work in much the same way as diatomaceous earth, but they're gentler on bees and other beneficial insects. Their active ingredient, potassium salts of fatty acids, penetrates insects' bodies, causing dehydration and death.

The EPA allows the use of insecticidal soaps on many crops and ornamental plants, from lawns to fruit trees. Insecticidal soaps control soft-bodied insects such as aphids, mealybugs, spider mites, and whiteflies. Their effectiveness varies widely and is thought to depend at least partly on the hardness of the water in which they're mixed; insecticidal soaps apparently work best in soft water.

Another commonly used mechanical control is horticultural oil. There are two types of horticultural oil: dormant oil and superior oil. Both are made of petroleum oils.

Dormant oil is applied as a spray in early spring, just before the buds burst open. It forms an airtight seal over insects emerging from their dormant winter state, suffocating them. Dormant oil controls scale insects, mites, and aphids. Pure dormant oil is nontoxic to mammals, birds, and beneficial insects, but may cause damage to plant foliage, so check the label for phytotoxicity.

Superior oils are lighter petroleum oils applied in mixtures with water. They can be used while plants are dormant or in full leaf, and therefore control a wider spectrum of insects in their crawling stage. Weak solutions of superior oils can be used on a wider variety of plants without causing leaf damage.

Horticultural oils are sometimes fortified with ethion, a highly toxic organophosphate which broadens their effectiveness. Read the label carefully when purchasing any oil product. Natural oil sprays are more difficult to find. The company Integrated Fertility Management offers a natural horticultural oil made from fish oils for use as a dormant oil on fruit trees (see suppliers list).

Chemical Controls

Determining the safety of chemical controls, even those derived from natural sources, is more complex. Natural-chemical pesticides, like synthetic petrochemical pesticides, are potent poisons.

Most chemical pesticides of natural origin do less ecological damage than the synthetics because they break down rapidly when exposed to heat, light, or water. This means they don't persist in the environment and are therefore unlikely to contaminate water and soil, or to be magnified in the food chain. Since they don't survive for long as residues on crops and other plants, they often must be applied frequently. However, this also means that little residue remains on crops grown for human consumption — which is why in most states certified organic farmers are allowed to use natural pesticides. (Regulations for certification vary from state to state.)

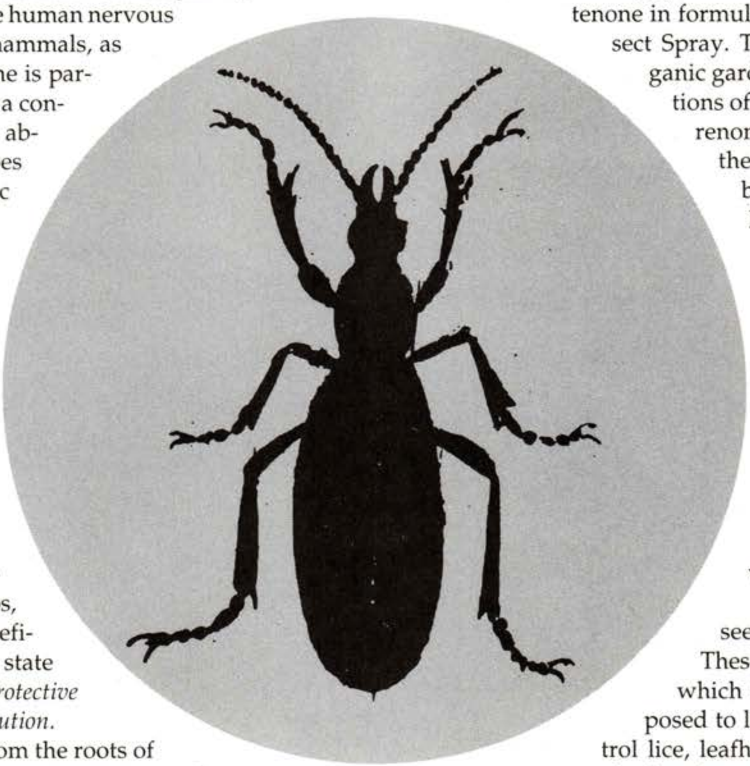
This might lead you to conclude that these compounds are safe. But persistence in the environment is only one measure of the safety of a pest control.

All pesticides are also rated according to their levels of acute toxicity: highly toxic, moderately toxic, slightly toxic, and relatively non-toxic. This is represented by a value called an LD50 (meaning Lethal Dose: 50%). It is the single dose (in mg per kg of body weight) which, when administered to laboratory test animals, killed 50 percent of the population. LD50s are determined for oral exposure as well as inhalation and absorption through the skin. Because the numbers represent single doses, they cannot be used to determine chronic toxicity or non-lethal health effects.

It's also important to note that LD50s are based on laboratory testing of the pure active ingredient, not necessarily the formulation available for sale. For instance, rotenone, a natural insecticide, has an oral LD50 of 50 to 75 mg/kg — very low, indicating that rotenone in its pure form is highly toxic. But the most potent formulation available to homeowners is a 5 percent dust, which is much less toxic.

LD50s vary widely from study to study, depending on what type of animal was used for the test, as well as the age, sex, and health of the animals. Assuming that variables in the laboratory are held constant, however, LD50s are a valuable measure of the relative toxicity of chemicals. Chemicals with very high LD50s (5000 mg/kg and above) are relatively nontoxic; for a lethal dose, an adult male would have to ingest more than a pint of the pure ingredient. The labels on products containing relatively non-toxic chemicals by law must display the word "CAUTION" in bold letters. Pesticides containing chemicals with oral LD50s in the double digits (0 to 50 mg/kg) can be highly toxic, depending on the formulation. A single taste to a teaspoon of the pure ingredient would be lethal. The labels of pesticides containing highly toxic compounds must read "DANGER—POISON" and include a skull and crossbones. No highly toxic pesticides are available for home-garden use; only certified pesticide applicators are allowed to purchase and apply them.

Five pesticides in common use today are botanicals, derived from plants. In order of lowest to highest LD50, or most toxic to least toxic, these are: nicotine, rotenone, ryania, pyrethrum, and sabadilla. Sales of these pesticides are increasing. The chart on pages 48 and 49 compares the LD50s of these botanicals with some popular synthetics. Although all five break down rapidly into harmless compounds once released in the environment, a few have other safety problems:



- **Nicotine**, which is extracted from tobacco plants, is a violent poison that injures the human nervous system. It's also toxic to other mammals, as well as to birds and fish. Nicotine is particularly dangerous because it is a contact poison, meaning it is easily absorbed through the skin and does not have to be eaten to have toxic effects. A slightly less toxic formulation, nicotine sulphate, was once widely available, but its use is now restricted in many states, including New York, where its sale to home gardeners is prohibited. Pure nicotine is federally restricted and illegal for home gardeners nationwide. Nicotine sulphate, sold under the brand name Black Leaf 40, kills a broad range of sucking insects and larvae, including aphids, leafhoppers, thrips, and leaf miners. It also kills beneficial insects. If it's legal in your state and you decide to use it, *wear protective clothing and apply with extreme caution.*

- **Rotenone** is extracted from the roots of many plants, and is available as a 1 percent or 5 percent dust or wettable powder, or as a liquid formulated with other botanicals such as pyrethrum or ryania. The more compounds included in the formulation, the broader its ability to kill and the higher its toxicity. Rotenone alone is approved, or "registered," by the EPA for use on a variety of edibles and ornamentals. It kills many insects, including Mexican bean beetles, cabbage worms, and flea beetles. It is most commonly available by its own name, but also by the trade names Prentox and Noxfish. The most powerful of the widely available botanicals, rotenone is moderately toxic to humans and many animals, and highly toxic to fish and other aquatic life. Therefore it *should never be used near a waterway.* Rotenone is both a stomach and a contact poison that slows the breathing and heart rates of many organisms, including mammals. Since rotenone is most commonly available as a dust, overexposure is most apt to occur through inhalation. *Wear a protective mask while applying it.*

- **Ryania** is made by grinding up the stems of a South American shrub, *Ryania speciosa*. It doesn't kill insects outright but makes them too sick to eat the treated crop. Of all the botanical pesticides, ryania is the most selective, killing only a few pest species, including the European corn borer, codling moth, and cranberry fruit worm. Combination formulations like Triple Plus (Natur-Gro) are effective on a broader range of pests. Like rotenone, ryania is a contact and stomach poison available as a dust, but it is less toxic to mammals. However, it breaks down more slowly, so persists in the environment longer. This increases ryania's effectiveness as an insect killer, but also increases the possibility that residues will remain on crops. *It should be applied long enough in advance of harvest to ensure that no residue remains on food.* This interval varies from crop to crop, but overall safe intervals should be listed on the product label.

- **Pyrethrum** contains active ingredients called pyrethrins, which are extracted from the seeds of a type of chrysanthemum. It controls dozens of fruit and vegetable pests such as leafhoppers, aphids, and cabbage loopers by paralyzing them on contact. Insects must be sprayed directly for the chemical to work, and will revive completely if they don't receive the lethal dose. For this reason, pyrethrum is often combined with rotenone in formulations such as Red Arrow Insect Spray. Those who want a totally organic garden should note that formulations of pyrethrum alone, such as Pyrenone or Pyrocide, often contain the chemical synergist piperonyl butoxide for increased potency. Formulations of pyrethrum are relatively non-toxic to humans, but slightly toxic to fish and other aquatic life. Like rotenone, pyrethrum *should not be used near waterways.* Pyrethrins should not be confused with pyrethroids, which are synthetic compounds and break down more slowly in the environment, and are more toxic to wildlife and honeybees.

- **Sabadilla** comes from the seeds of a South American lily. These seeds contain toxic substances which rapidly decompose when exposed to light. Sabadilla is used to control lice, leafhoppers, squash bugs, striped cucumber beetles, and chinch bugs. It's primarily a contact poison with low toxicity to wildlife. Usually formulated as a dust or wettable powder, Sabadilla is marketed by its own name and as Red Devil Dust. It is irritating to mucous membranes, so use a mask during application to protect your nose and throat. Sabadilla does have some residual effectiveness on plant surfaces, particularly when used in partial shade, but it does break down more rapidly than ryania. Some studies indicate that it's toxic to bees; like other bee toxins, *it should be applied during evening hours when honeybees generally are less active.*

One conclusion to be drawn from this information is that produce treated with botanical pesticides is generally safer for human consumption than produce treated with synthetics. However, the handling of botanicals during mixing and application is generally just as hazardous as the handling of most home-garden synthetics. Nicotine sulphate and rotenone are highly toxic, with LD50s lower than those of most commonly used home-garden synthetics. Just because something is natural doesn't mean it isn't toxic.

Whether you're using botanical or synthetic pesticides, clothing — long sleeves, pants, closed shoes, and particularly hats (pesticides are most readily absorbed through the scalp) — are a must, regardless of the weather. Heavyweight natural fibers, particularly cotton, are best. In fact, the garments that afford the best protection, barring expensive rubber suits, are denim jeans, shirts, and hats. All clothing should be laundered separately, and after each use.

A great deal of important information about pesticides can be found on product labels. Labels include information of crucial importance to both the user and, in cases of overexposure, the physician. It is a federal offense to use any pesticide in any fashion not in accordance with instructions listed on the label — a fact often overlooked by home gardeners. (See "How to Read a Pesticide Label" on page 47.)

Biological Controls

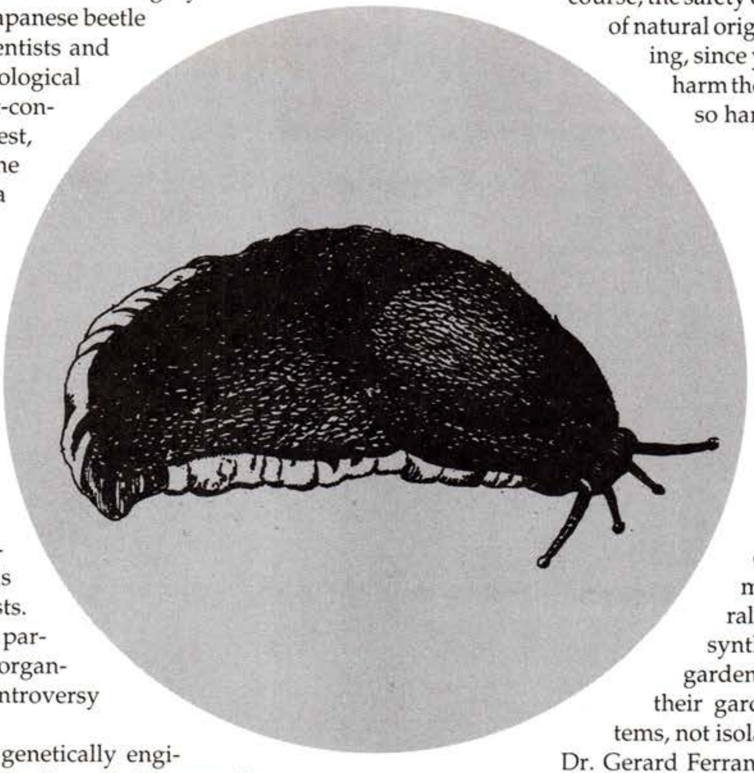
Natural pest controls like *Bacillus thuringiensis* (BT) and *B. popillae* (milky spore disease), which have become extremely popular in recent years, fall under this category. (They control caterpillars and Japanese beetle grubs, respectively.) Many scientists and environmentalists consider biological control the most promising pest-control strategy. It's also the oldest, having existed in nature since the beginning of time, and without a doubt it is the most complicated to use successfully.

Biological controls manage pest populations with other living organisms: viruses, bacteria, fungi, nematodes, protozoa, and predatory insects. Some types of biological control have been embraced widely. For example, many home gardeners now routinely purchase ladybird beetles and praying mantids to control aphids and other pests. But other biological controls, particularly genetically engineered organisms, have generated great controversy and concern.

The scientists developing genetically engineered organisms argue that they're safe because they aren't really new organisms but rather existing ones to which sections of genetic material have been added. Examples run the gamut from tomatoes "innoculated" with a gene from the fungus verticillium wilt and therefore immunized against this common tomato disease, to engineered bacteria which lower the freezing point of crops, making them less vulnerable to unexpected low temperatures. Many environmentalists fear that the release of any new organism, or recombined organism, into the environment cannot be adequately tested in the lab to determine its long-term safety to the biosphere. Currently, the development and testing of genetically engineered pest controls is strictly regulated, and it remains to be seen how many become available to home gardeners or farmers.

The biological controls currently available to home gardeners are very safe. They include the many predatory insects and mites available from most natural-gardening suppliers, as well as beneficial soil microorganisms (including the *Bacillus* species mentioned above). Some suppliers sell nematodes which they claim can kill root-eating worms and grubs. Many of these are indeed natural predators of grubs, wire worms, and so on, but they may take years to build up in the soil to levels needed for effective control. These same organisms proliferate naturally in compost piles, and some are present naturally in all healthy soils — if pesticides are not used. Suppliers also sell single-celled protozoa which control grasshoppers and crickets.

The vast majority of these products are environmentally safe because they're very host-specific, meaning they'll only attack a few pests, sometimes only one pest. So they're much less likely to kill beneficial insects. However, this also makes them complicated to use, since you must know which organisms are effective against which pests, what kinds of environmental conditions are necessary for their survival and reproduction, how their life cycles interact with the life cycles of the pests they're supposed to suppress and the plants they're supposed to protect, and so on. Biological control in the home garden is a challenge and an art; simply buying ladybugs and letting them loose in your yard will not do the trick. What's more, once you embark upon this course, the safety of chemical controls, even those of natural origin, takes on a whole new meaning, since you want to be sure they do not harm the beneficial insects you're trying so hard to nurture in your garden.



The marketing of organic gardening is now a profitable business because Americans are searching for environmentally safe alternatives to synthetic petrochemical pesticides. Most natural pest controls are less environmentally destructive than the synthetics, including pesticides derived from plants. However, organic gardening is much more than knowing which natural pesticide to substitute for which synthetic in your garden. Organic gardeners must learn how to deal with their gardens as complex natural systems, not isolated plantings. In the words of Dr. Gerard Ferrantino, an Integrated Pest Management specialist at Cornell University, "The more you learn about the system, the better equipped you are to make pest-management decisions."

FOR MORE INFORMATION

The following publications are good basic guides to organic gardening and natural pest controls:

- *Designing and Maintaining Your Edible Landscape Naturally* by Robert Kourik. 1986, Metamorphic Press, P.O. Box 1841, Santa Rosa, CA 95402.
- *The Encyclopedia of Natural Insect and Disease Control* by Roger B. Yepsen, Jr. 1984, Rodale Press Inc., 33 East Minor St., Emmaus, PA 18098.
- *Rodale's Garden Insect, Disease & Weed Identification Guide* by Miranda Smith and Anna Carr. 1988, Rodale Press Inc., 33 East Minor St., Emmaus, PA 18098.
- *Common Sense Pest Control Quarterly*, a newsletter published by the Bio-Integral Resource Center, P.O. Box 7414, Berkeley, CA 94707.

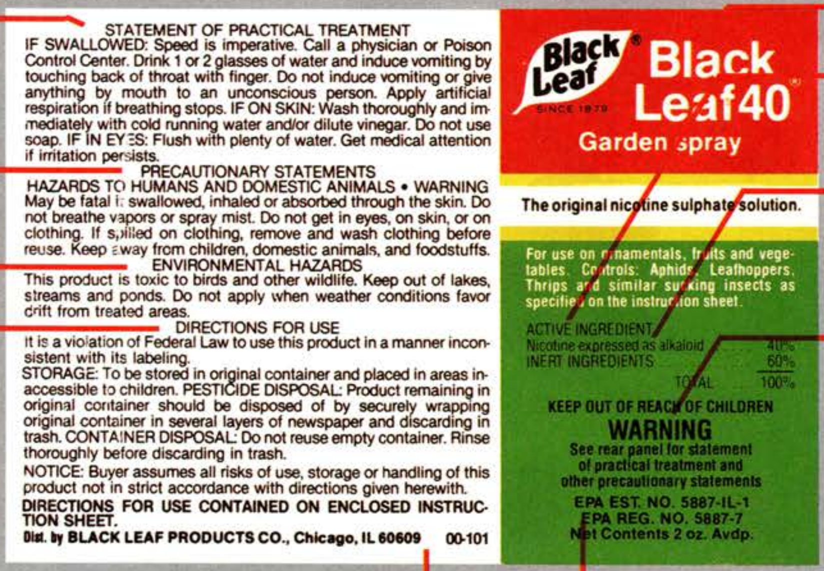
How To Read a Pesticide Label

Product labels are the home gardener's most important source of information about a pesticide's effect on the environment and human health. A label tells you everything from how to mix and apply a pesticide to which active ingredients it contains to which pests it can kill. It is against federal law to use any pesticide in any fashion not in accordance with instructions on the label -- a fact that is often overlooked by home gardeners.

The annotated label below points out what information is available on a pesticide label, and where..

BACK OR SIDE PANEL

FRONT PANEL



STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED: Speed is imperative. Call a physician or Poison Control Center. Drink 1 or 2 glasses of water and induce vomiting by touching back of throat with finger. Do not induce vomiting or give anything by mouth to an unconscious person. Apply artificial respiration if breathing stops. IF ON SKIN: Wash thoroughly and immediately with cold running water and/or dilute vinegar. Do not use soap. IF IN EYES: Flush with plenty of water. Get medical attention if irritation persists.

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS • WARNING

May be fatal if swallowed, inhaled or absorbed through the skin. Do not breathe vapors or spray mist. Do not get in eyes, on skin, or on clothing. If spilled on clothing, remove and wash clothing before reuse. Keep away from children, domestic animals, and foodstuffs.

ENVIRONMENTAL HAZARDS

This product is toxic to birds and other wildlife. Keep out of lakes, streams and ponds. Do not apply when weather conditions favor drift from treated areas.

DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

STORAGE: To be stored in original container and placed in areas inaccessible to children. PESTICIDE DISPOSAL: Product remaining in original container should be disposed of by securely wrapping original container in several layers of newspaper and discarding in trash. CONTAINER DISPOSAL: Do not reuse empty container. Rinse thoroughly before discarding in trash.

NOTICE: Buyer assumes all risks of use, storage or handling of this product not in strict accordance with directions given herewith.

DIRECTIONS FOR USE CONTAINED ON ENCLOSED INSTRUCTION SHEET.

Dist. by BLACK LEAF PRODUCTS CO., Chicago, IL 60609 00-101

Black Leaf® SINCE 1879

Black Leaf40®

Garden spray

The original nicotine sulphate solution.

For use on ornamentals, fruits and vegetables. Controls: Aphids, Leafhoppers, Thrips and similar sucking insects as specified on the instruction sheet.

ACTIVE INGREDIENT:	
Nicotine expressed as alkaloid	40%
INERT INGREDIENTS	60%
TOTAL	100%

KEEP OUT OF REACH OF CHILDREN

WARNING

See rear panel for statement of practical treatment and other precautionary statements

EPA EST. NO. 5887-IL-1

EPA REG. NO. 5887-7

Net Contents 2 oz. Avdp.

Directions for first aid in case of overexposure

Cautions regarding use of the pesticide and its human health hazards

A list of all known hazards to wildlife, beneficial insects, groundwater, etc., plus general instructions for avoiding these hazards

Detailed instructions on how to mix and apply the pesticide and a list of all pests and crops for which the EPA permits its use. *It is a federal offense to use any pesticide in any fashion not in accordance with these instructions*

Name of the company distributing the pesticide

The pesticide's common name

The chemicals which kill the pests, listed as a percentage of the formulation

Substances in the formulation which do not kill the pests, listed by percentage only, not by name

Signal word, listed in large letters, indicates toxicity:

CAUTION
relatively non-toxic or slightly toxic

WARNING
moderately toxic

DANGER/POISON
highly toxic

U.S. Environmental Protection Agency registration number (which signifies that the product has been registered with the EPA for the uses stated on the label) and establishment number (which indicates the facility where the pesticide was manufactured)

Suppliers

This is a partial list of companies offering a variety of natural pest-control products:

Green Earth Organics
9422 144th Street East
Puyallup, WA 98373
(206) 845-2321
Free catalog

Harmony Farm Service & Supply
P.O. Box 451
Graton, CA 95444
(707) 823-9125
Catalog, $2

Integrated Fertility Mgmt.
333-B Ohme Gardens Rd.
Wenatchee, WA 98801
(800) 332-3179
Free catalog

Mellinger's, Inc.
2310 W. South Range Rd.
North Lima, OH 44452
(216) 549-9861
Free catalog

The Natural Gardening Co.
217 San Anselmo Ave.
San Anselmo, CA 94960
(415) 456-5060
Catalog, $1

Natural Gardening Research Center
P.O. Box 14
Sunman, IN 47041
(812) 623-3800
Free "Gardens Alive" catalog

Nature's Control
P.O. Box 35
Medford, OR 97501
(503) 899-8318
Free brochure

The Necessary Trading Co.
New Castle, VA 24127
(703) 864-5103
Catalog, $2

Ringer
9959 Valley View Rd.
Eden Prairie, MN 55344
(612) 941-4180
Free catalog (includes products by Reuter, recently purchased by Ringer)

Safer Inc.
189 Wells Ave.
Newton, MA 02159
1-800-423-7544
Free catalog

TOXICITY OF HOME-GARDEN PES

PESTICIDES		CHEMICAL FAMILY	PRIMARY USES
SYNTHETIC	NATURAL		
	Rotenone (Noxfish™, Prentox™)	Botanical	Insecticide used primarily on vegetable crops for various beetles & cabbage worms
	Nicotine Sulfate (Blackleaf 40™)	Botanical	Kills many sucking insects and larvae
Propoxur (Baygon™)		Carbamate	Insecticide for cockroaches, flies, & other household pests as well as lawn pests
Chlorpyrifos (Dursban™, Lorsban™)		Organophosphate	Insecticide for lawn pests, some house pests, ticks, & mosquitoes
Diazinon (Spectracide™, KnoxOut™)		Organophosphate	Controls many insects & mites on fruits, vegetables, ornamentals, & lawns. Also used on insects in soils & indoors
2,4-D (Weed-B-Gon™, Weed & Feed™)		Chlorophenoxy	The most popular home weed killer
Carbaryl (Sevin™)		Carbamate	Insecticide used on many fruit, vegetable, tree, turf, pet, & flowering-plant pests
	Ryania	Botanical	Controls European corn borer, codling moth, cranberry fruit worm, & oriental fruit flies on fruit & some vegetable crops
Malathion (Cythion™ for indoor use)		Organophosphate	Controls many chewing and sucking insects on fruit, vegetables, trees, ornamentals, & houseplants. Also controls household pests
	Pyrethrum (Pyrenone™, Pyrocide™)	Botanical	Controls flies, mosquitoes, & fruit & vegetable pests, including aphids, many cabbage loopers, leafhoppers, white fly, & corn earworm
Glyphosate (Kleenup™, Roundup™)		Phosphonomethyl Glycine	Herbicide used to clear brush, control grassy weeds & poison ivy, & for spot treatments on lawns
Methoxychlor (Marlate™)		Organochlorine	Controls mosquitoes, flies, ticks, weevils, leafhoppers, Japanese beetles, and other insects. Not effective against aphids & mites
	Sabadilla (Red Devil Dust™)	Botanical	Insecticide for vegetable-crop pests, including striped cucumber beetles, squash bugs, leafhoppers, & European corn borer
Benomyl (Benlate™, Tersan 1991™)		Dithiocarbamate	Fungicide for use on fruit, vegetables, ornamentals, & lawns to control many fungus diseases

TICIDES, NATURAL VS. SYNTHETIC

LD50s*			
mg/kg ORAL	mg/kg DERMAL	HUMAN EFFECTS**	ENVIRONMENTAL EFFECTS
50-75	>940	Slows breathing & heart rate Irritating to eyes	Breaks down quickly on plants & soil; lasts up to one month in water. Highly toxic to fish; low toxicity to birds & honeybees
83	285	Injures the nervous system Readily absorbed through skin	Breaks down quickly Kills mammals, birds, fish, & beneficial insects; relatively safe to bees
95-104	>1,000	Probable carcinogen Temporarily disrupts function of the nervous system	Lasts up to one month on plants. Toxic to fish & other wildlife; hazardous to honeybees. Some formulations restricted
97-276	500-2,000	Disrupts function of the nervous system	Persists up to 1 year in soil Toxic to bees, fish, birds, & other wildlife Many formulations restricted
300-400	455-900	Disrupts function of the nervous system	Lasts 1-2 weeks on plants; 2 months in soil Toxic to bees, fish, waterfowl, & other wildlife
375-800	800-1,500	Irritating to lungs, stomach, & intestinal linings Can injure liver, kidneys, & nevous system	Persists in water & soil up to 6 months Toxic to bees & fish
500-850	>4,000	Chronic exposure causes loss of appetite & weight, & weakness	Lasts several weeks on plants; 3 months in soil. Highly toxic to honeybees; slight hazard to birds, fish, & beneficial insects
750-1,200	>4,000	Relatively non-toxic	Lasts longer than the other botanicals in the environment Relatively safe to wildlife & beneficial insects
1,000-1,375	>4,444	Disrupts function of the nervous system	Does not persist long in the environment Toxic to fish, honeybees, & beneficial insects; low toxicity to mammals
1,500	>1,880	Relatively non-toxic	Lasts longer than most botanicals in the environment Toxic to honeybees, many beneficial insects, fish, & other cold-blooded animals
4,300	>7,940	Irritates lungs & eyes	Quickly inactivated in soil Low to moderate toxicity to fish & wildlife
5,000	>6,000	Disrupts nervous system Some buildup in fat cells Readily absorbed through skin	Lasts several weeks on plants and longer in soil & water. Toxic to fish & bees, little or no hazard to birds, beneficial insects, & mammals
5,000	Little or no reaction	Relatively non-toxic Irritates mucous membranes of nose & throat	Relatively safe to wildlife, but toxic to honeybees
9,590	Little or no reaction	Possible carcinogen Mildly irritating to skin, eyes, nose, & throat	Very persistent in the environment Hazardous to fish; relatively nonhazardous to honeybees Increases in toxicity as it breaks down

*An LD50 (Lethal Dose: 50%) is the single dose in mg per kg of body weight which, when administered to laboratory animals, killed 50% of them. LD50s are determined for oral exposure to a pesticide and absorption through the skin. Pesticides with very high LD50s (5000 mg/kg and above) are relatively non-toxic. Pesticides containing chemicals with oral LD50s in the double digits (0 to 50 mg/kg) can be highly toxic, depending on the formulation.

Source: 1988 New York State Pesticide Recommendations, Cornell University

**Only two of the pesticides on this chart have been classified as cancer causers by the U.S. EPA. However, some scientists consider some of the other pesticides to be potential carcinogens as well. See "Rating Cancer Risks" on page 42.

PRINTING GARBAGE ON RECYCLED

Here's how we decided in favor of the business — and the environment.

BY PATRICIA POORE

When you send out a mailing that includes a postpaid return envelope, you're likely to get a few strange letters back. In 1982 I got one with a Minnesota postmark and a cow pie inside, carefully wrapped in wax paper. I guess they didn't like our offer.

A mail campaign* launched **GARBAGE** magazine, and it solicited the usual sprinkling of nasty (unsigned) responses. One person wrote, "I bet you're not even going to print this on recycled paper, and I bet you don't even have the nerve to answer me, do you?" Well, I couldn't answer because s/he didn't give a name or address. But I'll tell the whole story here.

This paper is called Cross Pointe Troy Book 60# Blue-White Satin-Thin. It's a premium-grade paper, so it's not cheap, but on the other hand it's no more expensive than the (nonrecycled) paper grade we'd have chosen anyway.

It contains from 50%-70% recycled fibers. (Testing is done at the mill to determine virgin-fiber content necessary for each batch to ensure adequate tensile strength.) Its film coating, not a glossy clay coating, makes it more economical to recycle than other coated sheets.

The right answer may seem obvious: An environmental magazine should be printed on recycled paper. Magazine publishers, however, would think the *opposite* answer is the obvious one: Recycled paper? Not if you want a commercially successful magazine that will be found on the newsstand and that will attract advertisers. (Maybe this is why the two largest environmental magazines are printed on premium-grade gloss-coated paper, not on recycled.)

For most printers, too, the answer was obvious: Recycled paper is fine for club newsletters, but it's not the right choice for larger press runs on web presses. (A web press uses rolls of paper, not sheets, and the high speed of the roll through the press calls for paper with excellent tensile strength. It also calls for smooth, lint-free paper. Recycled paper has had a reputation for being weak and linty.)

Aha. So, like everything else that starts out black-and-white but gets a whole lot greyer when it meets the real world, our decision wasn't going to be easy. I didn't want my business to die from an overdose of higher-moral-purpose. A dead magazine wasn't going to be much help to anybody.

Let me say here that, as a company, we'd already changed to recycled paper for all of our one-time-use printing: stationery, direct mail, media kits, folders, business cards. I certainly believe in

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*also known as junk mail, unless it happens to be something you're interested in. By the way, an article examining the environmental impact of the magazine industry is forthcoming.

The publisher in me said "no way." Risk being dismissed by sophisticated readers, newsstand distributors, and potential advertisers? Pay *more* for inferior paper my printer is hesitant to use?

recycled paper for ephemeral uses. Besides, much of it was sheetfed work. More grades of recycled sheetfed paper are available, printers are more used to it, and it doesn't command as high a premium as does recycled paper for web-press.

However, I'd pretty much decided that the magazine itself would be printed on premium (virgin) paper. At an informal lunch one day, I realized I had a mutiny on my hands. Only the associate publisher agreed with me; the rest of the staff wouldn't hear of it. "It's just too hypocritical!" they shouted.

"Trees are a renewable resource," I defended.

"That's not the point. Paper ends up in landfills unless it's recycled, and it won't get recycled unless there's a market for recycled fibers. We should put our money where our mouth is and help create that market — by buying recycled paper!"

Now, I thought it was questionable what real impact our bimonthly, drop-in-the-bucket usage would make. On the other hand, one could argue that while our usage is low in volume, it's high in visibility. A dozen radio interviews, several wire-service newspaper articles, and this story attest to that already.

I knew I didn't want to look like a woody ecology journal. So I challenged the art director and the managing editor to find a recycled and recyclable paper that (1) was bright white and consistent in color; (2) had a hard surface with sheen; (3) was available for web offset printing; (4) cost about the same as the nonrecycled publication-grade papers we'd been considering; (5) was acceptable (for quality and mill availability) to our printer.

It took a couple of months. But they did find a paper everybody could live with. The editor in me is very happy with our decision and the publisher in me is cautiously optimistic. Like other things about this venture, the paper is an experiment. I hope we've created a third choice in publication printing: one that allows high quality and customer acceptance while at the same time allowing a saner approach to use of resources.

I think other people who order printing would be just as happy to specify recycled paper if it were easy to do that. But I can understand why few people go to the trouble. Quite honestly, I doubt we would have considered recycled paper if we weren't publishing a magazine called **GARBAGE**. Because of the subject we're covering, our consciousness about such things is high. And then there are those confrontational questions we have to answer. For others, it will probably take an economic kick in the pants for recycled paper to become the standard, with 100% virgin paper used more rarely.

Specifying recycled paper is sure to get less arcane as the need becomes apparent. We'll do our part: A future article will delve into the topic more extensively. We'll share the technical information we learned and list suppliers.

Let me address three other often-asked questions. I've been asked whether repulping paper doesn't require chemicals and use energy. Yes, deinking and bleaching uses chemicals and creates a sludge. But it's clear that repulping is more efficient and somewhat cleaner than producing new paper. And recycling paper certainly helps solve the solid-waste crisis.

On the recyclability of coated paper: Publication-grade glossy papers are coated with a clay-based material that can cause problems or add to expense in recycling. Recent advances in the industry have made it possible to recycle even clay-coated sheets. But the coating presents challenges not faced with uncoated sheets. If the coating is not removed prior to repulping, it may add an excessive amount of filler in the recycled product (weakening the remilled paper). If the clay is removed (usually during the deinking process), it contributes to the burden of solid effluent the mill will have to dispose of.

On inks: For economic reasons linked to environmental regulations, most large printers are recycling their inks now. On the home front, I walked into the art department one day to find Bekka hunched over her PMS book, x-ing out colors. "I don't want to spec toxic inks," she explained. (Translation: PMS stands for Pantone Matching System, an arrangement of numbered color chips used to specify colors to the printer.)

It seems one of our printers had faxed her a memo from an ink manufacturer that listed printing inks likely to contain Section 313 chemicals [i.e., Section 313 of Title III of the Superfund Amendments and Reauthorization Act, which requires users of certain EPA-listed chemicals to report releases of those compounds]. In printing inks, these are most often copper- and barium-containing compounds. So we will not knowingly be using inks that contain compounds which have been implicated in heavy-metals pollution.

I can attest to the fact that printing on recycled paper has saved energy. Mine. When an interviewer or reader asks me if the magazine is printed on recycled paper — and they *always* ask — I say simply "yes." I'm rather relieved I don't have to explain why *not*, instead — though the answer, really, is not so simple (or final).

The editor in me said "go for it." Not only was it the right thing to do, but also I was cocky enough to think we could make recycled paper look good.

KEEPERS

ANTIDOTES TO THROWAWAYS

Reviewed by Ginia Bellafante

Cellulose Bags

After reading about the environmental problems of plastic packaging, you're probably wondering what the more ecologically sound alternatives are. One way to avoid using excess plastic in your home is to store food in cellulose bags. Cellulose, derived entirely from plant fiber, is biodegradable and non-toxic, and keeps refrigerated foods fresh and odor-free. The Earth Care Co. makes cellulose food-storage bags in three sizes — "spice," "sandwich," and "bread bag" — with twist ties for fastening. They're sold in 100-, 500-, and 2500-bag quantities and are priced from $6.15. Write or call the Earth Care Paper Co., P.O. Box 3335-GM, Madison, WI 53704; (608) 256-5522. Free catalog.

Sun Power

A few years back, consumers in search of solar-powered products had a limited variety of items to choose from. But photovoltaic technology has developed by leaps and bounds, and today some elaborate devices are available to consumers who want to save energy without giving up the convenience of their favorite electronic gadgets. Two of the trendier products are an outdoor garden lamp and a sports radio complete with earphones. Both employ photovoltaic panels that absorb sunlight, store it in a battery, and convert it into electricity.

The solar lamp is ideal for walkways and patios, and saves you the expense of running electric cables from your house out to the garden. The lamp should be placed in open sunlight (not under trees) and will provide approximately five to six hours of light per night for an area of several square feet. Lamps are manufactured by Chronar's Sunenergy line and available in six-by-six- and six-by-twelve-inch panel sizes for $49.95 and $79.95 at Ace, True Value, and other hardware stores around the country.

The radio, popular among joggers and cyclists, requires a three-hour stint in the sun every few days to generate enough power for four hours of playing time. (It also runs on conventional AA batteries.) Priced at $39.95, it's available from Solar Electric Engineering, (800) 832-1986.

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Diaper Alternatives

During the past 20-plus years, Procter & Gamble and Kimberly-Clark, the leading manufacturers of disposable diapers, have done a more than successful job selling convenience to parents, in packages labeled Pampers and Huggies. Americans spend $3.5 billion annually on the 18 billion diapers that end up in landfills each year. Constructed from a variety of plastics, single-use diapers take 300 to 500 years to decompose. As solid waste becomes more and more of a problem, the need for us to be aware of alternatives becomes clear.

Unfortunately, the much talked-about biodegradable disposables that manufacturers claim decompose in two to five years aren't the answer. These new diapers, touted as environmentally safe, contain granules of a cornstarch derivative that allegedly attract microorganisms in a landfill and speed the breakdown of a diaper's plastic matrix. However, solid-waste experts like Carl Lehrburger at Energy Answers Corporation, an Albany-based consulting firm, are very skeptical. "The oxygen necessary to decompose waste in a landfill is severely limited, so the two-to-five year figure is probably an underestimation. The issue around diapers needs to be reusability and recyclability, not biodegradability," he says. Lehrburger claims that a potentially smarter alternative to the landfilled biodegradable would be a flushable diaper consisting of a reusable cover and flushable inner pad.

Chux
All-in-One Diapering for Baby's Outings
Take-Away, Throw-Away Chux Disposable Diapers

A 1959 ad for one of the first disposable diapers.

Flushable diapers aren't yet available, but parents have some excellent options in the meantime. Bumkins, a Utah-based company, is manufacturing a one-piece washable diaper that will last through 200 launderings. It features a waterproof nylon cover and absorbant thick cotton padding. Order by the dozen in either baby or toddler size by calling (801) 465-9330. (Baby size is $49.95 plus $2.50 shipping and handling, toddler is $69.95 plus $4.00 shipping and handling.) Parents should also consider the tried-and-true cloth diaper service. Most services will drop off clean cotton diapers to your home weekly, pick up the soiled ones, and save you about $530 over the cost of disposables for a standard 30-month diapering period. Call the National Association of Diaper Services at 1-800-462-6237 for a list of diaper services in your area.

To keep your baby extra dry and comfortable, try placing a breathable wool cover over a cotton diaper. Biobottoms makes Velcro-fastened, fitted covers that can go through about five diaper changes before they need washing. Biobottoms, Box 6009, 3820 Bodega Ave., Dept. GM, Petaluma, CA 94953; (707) 778-7945. Free catalog.

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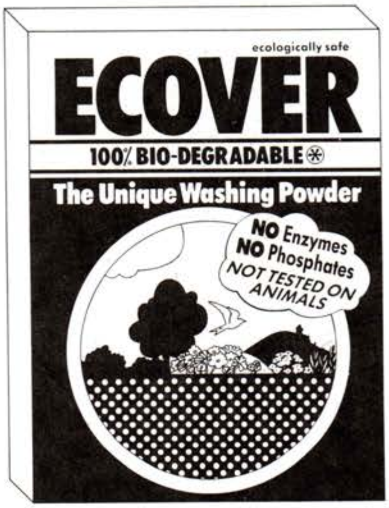
Taking a close look at the ingredients in some of your household cleaning products can be unsettling. Dishwashing liquids, laundry detergents, floor soaps, and other products are generally made with some form of processed petroleum, artificial colors, fragrances, and chemical bleaches. These substances are irritating to the skin and detrimental to the environment as well. The toxin-laden agents typically used in cleaning products break down slowly and often incompletely, prolonging the polluting effects on our rivers, lakes, and bays, endangering the plants, animals, and microorganisms that live in them.

Ecover, a Belgian-based company with a U.S. distributor, exports a full line of ecologically safe cleaners, all of which break down into harmless natural substances within three to five days. Ecover replaces standard petroleum derivatives with vegetable-oil bases, substitutes plant extracts for synthetic perfumes, and refrains from using coloring agents and dangerous bleaches of any kind. Included in the product line: laundry powder, dishwashing liquid, toilet cleaner, fabric softener, and several other items. Look for Ecover in health food stores nationwide or in the Seventh Generation Catalog, 10 Farrell Street, Dept. GM, South Burlington, VT 05403; (802) 862-2999. Seventh Generation offers an Ecover economy pack for $24.95, which features a sample of each product. Catalog, $2.



Energy-Efficient Light Bulb

There are one or two lights in every house that are on for a few hours each day. These fixtures are prime candidates for compact fluorescent bulbs, which cost more intially than standard incandescents, but are big energy savers. Compact fluorescents, usually 15 to 18 watts, provide the intensity of bulbs in the 60-to-75-watt range but draw a fraction of the electricity. They have a three-year lifespan (even based on a 12-hour-a-day usage estimate!) and outlast incandescents by about 9,000 hours — so you're not only saving energy dollars, but the cost of replacement bulbs as well. Because of improved color rendering, the flickering and eye irritation commonly associated with fluorescents is virtually non-existant in the compacts. The bulbs, manufactured by Philips, GE, and Osram, range in price from $15 to $20 but will pay for themselves after about 2000 hours. Look for the bulbs in hardware stores and home centers nationwide or call the manufacturer directly to find the dealer closest to you. Philips: (800) 543-8167, GE : (800) 626-2000, Osram: (800) 431-9980.

Investing with a Conscience

Although ethical investing isn't a new idea, mutual funds devoted exclusively to backing socially responsible corporations have recently gained unprecedented popularity. Once regarded as radical and unprofitable, "altruistic" funds are now successfully competing with those that are strictly profit-oriented.

Like other mutual funds, ethical or social funds pool individual investments together. But unlike conventional funds, they buy shares only in companies that pursue bright financial futures while working for a better world. Prospective companies are first subjected to conventional financial screens (research analysts conduct detailed studies on a corporation's prior earnings and potential for growth) before they are judged for their ethics. The criteria typically used to measure a corporation's social conscience are its records on environmental safety, minority hiring and advancement, and active community involvement. Most of these funds will not invest in the nuclear-energy industry, nor will they invest in companies that manufacture alcohol or tobacco products, maintain economic ties to South Africa, or engage in weapons contracts.

The Calvert Social Investment Fund, widely recognized as having the most stringent ethics-screening practices in the business, places an especially high priority on a company's history of environmental safety. In addition to applying the standard screens, CSIF does not invest in the toxic pesticide or CFC industries (CFCs, or chlorofluorocarbons, have been linked to ozone depletion in the upper atmosphere), nor does it invest in violators of EPA regulations or corporations involved in criminal or civil environmental litigation. The fund will, however, seek out companies that initiate recycling programs and demonstrate a generally cooperative attitude toward healthy environmental policy.

Considered a low-risk portfolio, the Calvert Social Investment Fund has had an impressive 13.2% average annual return during the five-year period ending December 31, 1988. For those interested in a less conservative venture, the Parnassus Fund, rated among the top five of all mutual funds for 1988 in terms of net yield, is an excellent choice. Contact CSIF at (301) 951-4240 or outside of Maryland, (800) 638-6731, or Parnassus at (415) 362-3505 or outside of California, (800) 999-3505 for more information. Initial investments of $1000 to $2000 are required for both funds.

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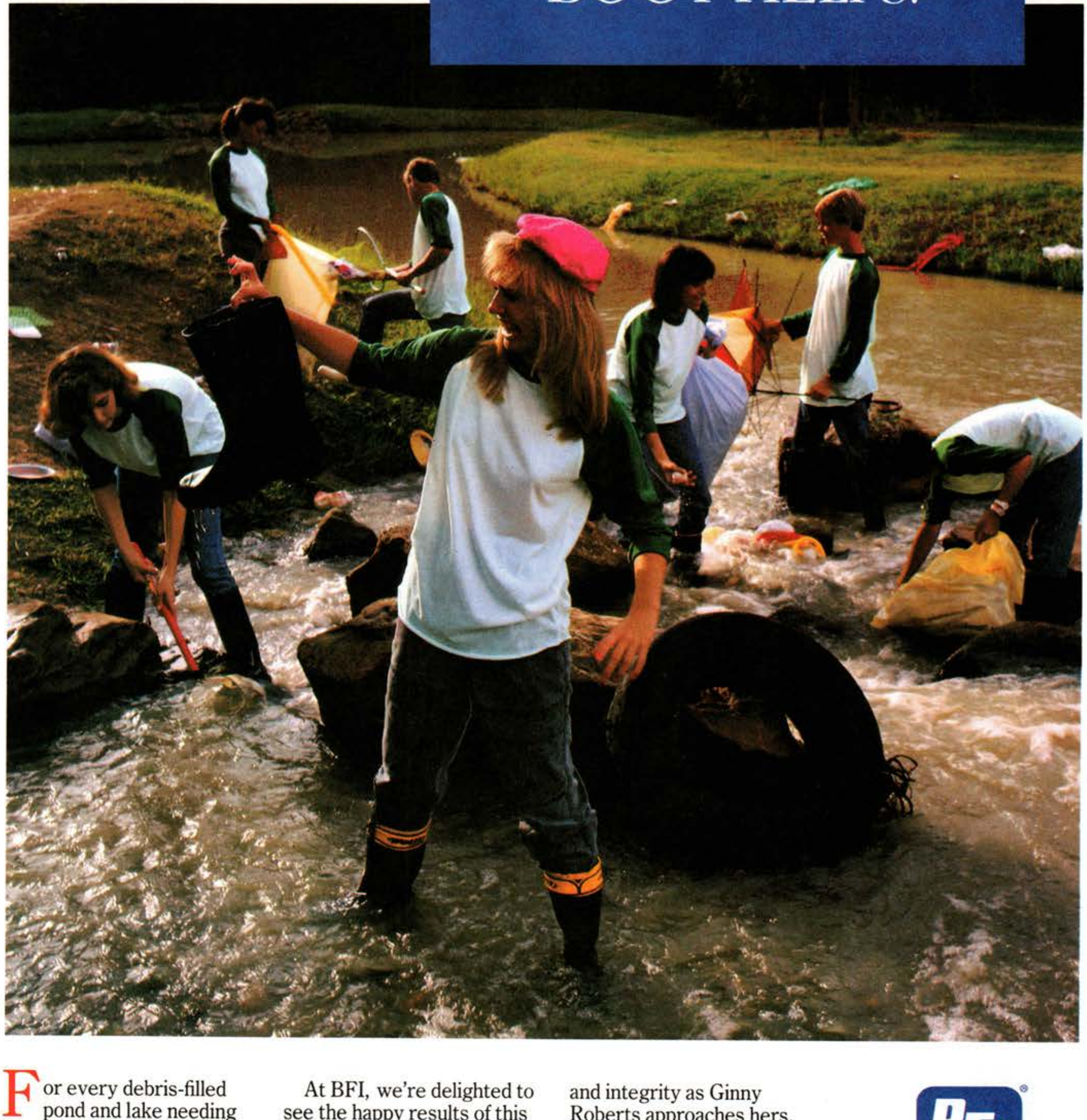

For every debris-filled pond and lake needing a clean-up, all over America there are teams of volunteers proud to work together and lend a hand. Their spirit is strong. Their purpose is plain: to help make this land, our nation, a cleaner, brighter place to be.

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Xeriscaping

Water shortages in many parts of the country have led prudent gardeners to give up on their favorite water-guzzling plants and turn instead to xeriscaping — the use of plants and fertilizers that don't deplete the soil of water. A xeriscaper's garden is likely to include many of the drought-tolerant natives found in the American Southwest and other dry, hot climates. Techniques particular to xeriscaping include the use of mulch to prevent evaporation, and the grouping together of plants with similar irrigation requirements so that no plant is overwatered.

Botanicals, a small Massachusetts-based business, is one of the few nurseries specializing exclusively in plants adaptable to difficult climatic conditions. The perennials, shrubs, and alpines they carry, many of which are little-known or threatened species, are all available by mail order. Selections come from the U.S., Europe, and Asia. Botanicals, 219 Concord Road, Dept. GM, Wayland, MA 01778; (508) 358-4846. Catalog, $1.50.

Low-flow Showerheads

It's estimated that a typical four-member American household uses an incredible 83 gallons of water a day showering and bathing. The severe droughts of the past couple of years have underscored the need to conserve water. One good way to curb home consumption is to replace a conventional showerhead with an easy-to-install water-saving device.

Standard showerheads emit up to eight gallons of water per minute, whereas their water-conserving counterparts generally spout a mere two to two-and-a-half gallons per minute. What's more, homeowners receive the added bonus of substantial savings at water- and heating-bill time, since low-flow heads use up less hot water.

And the new generation of low-flow heads provide shower quality equal or superior to that of conventional heads. The high-velocity pulsing jets now used give you an invigorating shower, not the timid trickle of older models.

Because many landlords and builders have begun installing water-conserving showerheads, you may have a water saver already and not know it. So before you purchase one, perform this simple test: Place a one-gallon milk jug under your shower and turn on the water. If the jug fills in less than 20 seconds, it's time to switch to a more efficient device.

The heads range in price from about $6 to $17 (the more expensive models generally have flow-rate adjustors) and fit standard 1/2" shower arms. Most models are brass with chrome plating. The following brands provide above-average water savings and excellent shower quality:

- The NOVA B6401, available through Ecological Water Products, 1341 West Main Road, Dept. GM, Middletown, RI 02840; (401) 849-4004.
- The Incredible Head line by Resources Conservation Inc., available in hardware stores and home centers nationwide.
- Ondine Super Watersaver, also available in hardware stores and home centers nationwide.

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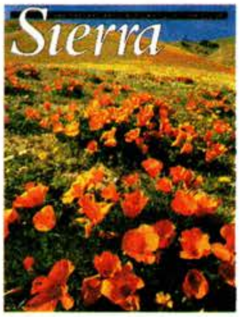

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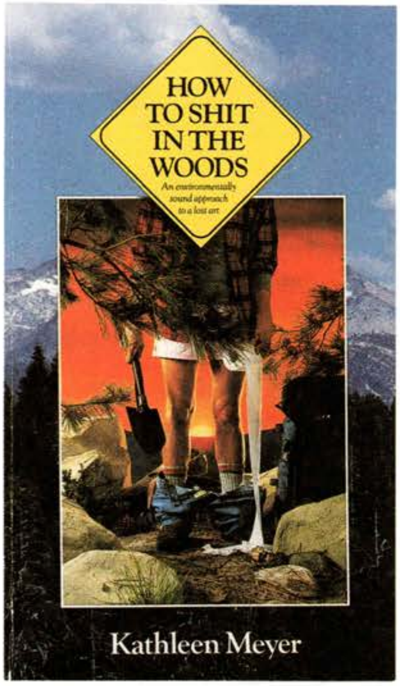
How to Shit In the Woods: An environmentally sound approach to a lost art

by Kathleen Meyer. 77 pages, Ten Speed Press, PO Box 7123, Berkeley, CA 94707, $7.95 ppd.



It's not a spoof. It's a specific, helpful how-to guide written after years of practical experience. Conversational and occasionally very funny, the text offers advice that's environmentally sound and not at all preachy. Good, clear, pertinent stuff — I wish every how-to book were written like this one!

The book has two points: how to do it with dignity and in comfort, and how to do it with environmental awareness. "Tragically, no longer can we drink from even the most remote, crystal-clear streams without fear of contracting *giardia*, a disease spread through fecal deposits in or about the waterways — and a disease unknown in the U.S. wilderness prior to the 1960s." Underlying the practical guidance in this book is a message about what's happening out there in what we used to call the wilderness.

The author, an outdoorswoman and river guide, includes information on such basics as squatting positions, getting above the high-water line, and digging a hole. Then she moves on to winter and ocean disposal, the special problems encountered by rock climbers and women, and toilet paper alternatives found in nature. Field-water disinfection gets thorough treatment, as does diarrhea. She explains what conditions call for "packing it out" and explains how to do that. Gross, huh? Yeah, well, not as gross as finding the deposits of last winter's cross-country skiers when the snow melts.

I wasn't offended by the title (I had, after all, named a national magazine **GARBAGE**), but I wondered why the author had risked using that word. My reservations vanished after I'd read her Author's Note, a very rational, thoughtful, and personal essay on terminology. Her views about the past and future etymology of the unambiguous word "shit" are backed up by a four-page dictionary defining shit and related expressions. (Ah, America.) Even more inevitably than garbage, shit is here to stay. We'd better start thinking about it.

— *Patricia Poore*

Rodale's Garden Insect, Disease & Weed Identification Guide

by Miranda Smith and Anna Carr. Illustrations by Robin Brickman. 328 pages, Rodale Books, 33 East Minor St., Emmaus, PA 18098. Hardcover, $21.95 ppd.; softcover, $15.95 ppd.

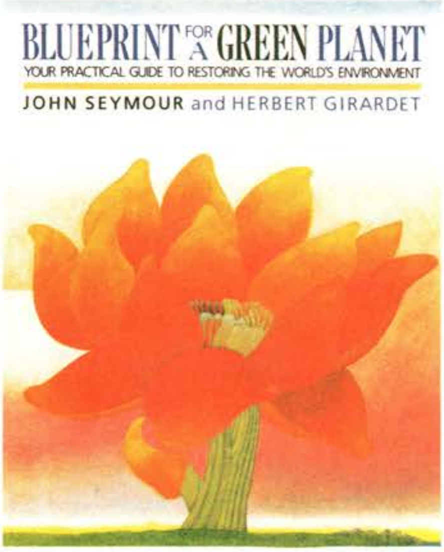
Every gardener who'd like to go organic but doesn't know how to start should buy this book. It'll help you tell good bugs from bad bugs. It's a good field guide to weeds and plant diseases, and the latest natural controls to keep pests in check. Fifty color photos of the worst pests and their damage, color photos of common plant diseases, and black-and-white drawings of insects and the wild plants we call weeds make identification easy.

There's also a short but healthy dose of philosophy: One of the most important lessons for new organic gardeners is that very few of the "weeds" and insects in our gardens pose any threat. They're not only harmless, they're vital to healthy backyard ecology since they aid in the decomposition of organic matter, keep weeds in check, and pollinate almost every fruit, flower, and vegetable.

— *Janet Marinelli*

Blueprint for a Green Planet: Your Practical Guide to Restoring the World's Environment

by John Seymour and Herbert Giradet. 192 pages, Prentice Hall Press, One Gulf + Western Plaza, New York, NY 10023, $17.95 ppd.


BLUEPRINT FOR A GREEN PLANET
YOUR PRACTICAL GUIDE TO RESTORING THE WORLD'S ENVIRONMENT
JOHN SEYMOUR and HERBERT GIRARDET

Smart alternatives to wasteful living — that's the gist of this comprehensive guide by conservationist John Seymour and ecologist Herbert Giradet. Each chapter provides background information on specific environmental issues such as acid rain, deforestation, and solid waste — to show us how we got into trouble, then lists lifestyle changes that will lead the way out: cutting down on road transportation, requesting locally grown produce, recycling household waste.

Congratulations to Seymour and Giradet for avoiding the doom-and-gloom approach to typically depressing subjects. The book is solution-oriented and the graphics are lively. *Blueprint for a Green Planet* is a helpful tool for managing the planet.

— *Ginia Bellafante*

People of the Tropical Rain Forest

edited by Julie Sloan Denslow and Christine Padoch. 232 pages, University of California Press, 2120 Berkeley Way, Berkeley, CA 94720, $21.95 ppd.

For many people, the issue of deforestation is inextricably linked to ozone depletion and global warming. *People of the Tropical Rain Forest*, a collection of essays by anthropologists, botanists, and policymakers, shies away from a hard-science angle and offers an interesting look at the effects of deforestation on the indigenous peoples of Asia, Africa, and the Amazon basin. The photographs are vibrant, and the editors have included a variety of articles on the prehistoric occupants of the forests, contemporary hunter-gatherer and slash-and-burn societies, local businesses, and the influence of Western corporations in the various regions. Many of the essays illustrate the ways that industry and deforestation have contributed to the displacement of rural populations, but other pieces note the more positive effects industrial growth in rain-forest regions has had on some developing world economies.

— *Amelia Burgess*

Beyond 25 Percent:
Materials Recovery Comes of Age

by Theresa Allen, Brenda Platt, and David Morris. 134 pages, Institute for Local Self-Reliance, 2425 18th Street, NW, Washington, D.C. 20009, $40 ppd.; $25 ppd. for grassroots groups.

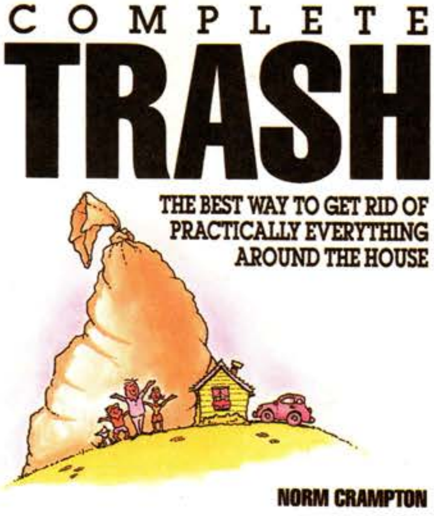
This collection of case studies tells you which 15 American communities are recycling the most and why. Woodbury, New Jersey, leads the nation with a 50 percent recycling rate, followed by Longmeadow, Massachusetts, which recycles 49 percent of its wastes, according to the authors. (The authors are all affiliated with the Institute for Local Self-Reliance (ILSR), a Washington, D.C.-based research group that specializes in energy- and waste-utilization programs for community development.)

The ILSR concludes that recycling glass, aluminum, and other packaging materials is not enough: Only communities with aggressive municipal composting programs for yard wastes have managed to recover more than 25 percent of their trash. The communities studied have also set high goals for waste recovery, made recycling mandatory, and distributed recycling containers to residents. The case studies are detailed — some even include a breakdown of recovered materials — and each lists contacts who can provide further information.

— *Bruno R. Tedeschi*

Complete Trash:
The Best Way to Get Rid of Practically Everything Around the House

by Norm Crampton. 136 pages, M. Evans and Co., 216 East 49 St., New York, NY 10017, $10.20 ppd.


COMPLETE
TRASH
THE BEST WAY TO GET RID OF PRACTICALLY EVERYTHING AROUND THE HOUSE
NORM CRAMPTON

This is a "coping with it" book that gives the best advice available at the moment, taking reality into account. (Many best-case disposal alternatives are simply not widely available yet.) The author is concise and friendly. He arranged his text from A to Z so it's easy to look up your current dilemma. (He writes from the point of view of a householder, but he's also Secretary of the Institute for Solid Wastes of the American Public Works Assn.)

Complete Trash tells you how to get rid of not only obvious bugaboos like car batteries and oven cleaner, but also dead pets and Christmas trees. The "why" behind each suggestion is provided. Reference is made to recycling, burning, burying (landfilling), and composting. The most telling thing about the book, however, is how often the author is forced to say, "Just throw it in the trash." We have a long, long way to go.

You say you'd be more careful with your garbage if you just knew what to do? Buy this book; it will lead you on an easy, if imperfect, path toward virtue.

— *Patricia Poore*

Rush to Burn:
Solving America's Garbage Crisis

225 pages, Island Press, P.O. Box 7, Covelo, CA 95428. Cloth, $22.95 ppd.; paper $14.95 ppd.

Rush to Burn is the result of a six-month investigation by reporters at *Newsday*, a New York-metropolitan area daily. The book, basically a compilation of news stories previously published by the newspaper, assesses the national and global implications of the garbage crisis by using New York City and Long Island as cases in point.

"Rush to burn" refers to the tendency among local officials to embrace incinerators as the solution to the garbage crisis when landfills close. This tendency is attributed largely to budget cuts made during the Reagan Administration, which drastically reduced the number of federal officials who could provide local governments with sound advice on solid waste. Without enough technical assistance from the federal government, municipal officials often have been forced to turn to private consultants at companies in the business of constructing and operating incinerators.

While incinerators solve the short-term disposal crisis, they have a history of air pollution problems, and they produce ash that still needs to be landfilled and is often toxic. What's more, they need plastic and paper to burn efficiently, which means that materials which could be recycled end up being burned.

This book is an excellent source for municipal officials faced with closing landfills, as well as concerned citizens who want to know more about incinerators.

— *Bruno R. Tedeschi*

READER SERVICE

1. Environmental Tips—A "doer's guide" of ideas for your community that build spirit and use internal resources. Sample newsletter and membership information available. Great for neighborhood groups, civic associations, small towns or families. Free literature. **Rodale Institute.**

2. The Diaper Solution — This waterproof, washable, all-in-one diaper is the solution to the diaper crisis. The only convenient, economical and ecologically safe alternative to disposable diapers. Also: "The Lost Art of Diapering" pamphlet teaches disposable users how to use Bumkins. Free. **Bumkins International.**

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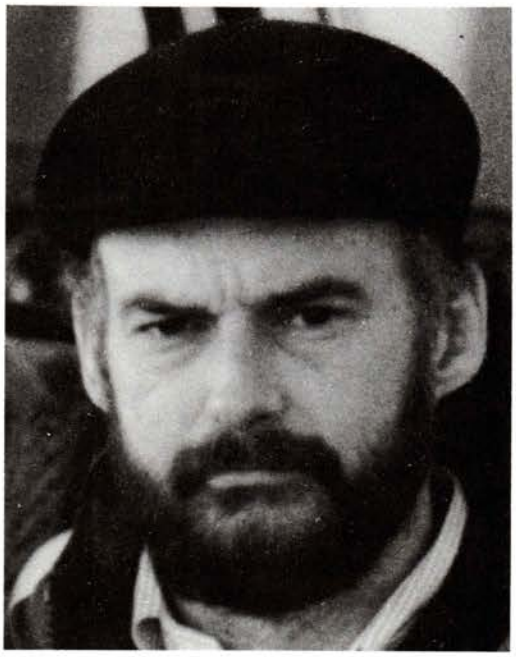

It would be easy to blame the Valdez oil spill on one man. Or one company. Or even one industry.

Too easy.

Because the truth is, the spill was caused by a nation drunk on oil. And a government asleep at the wheel.

Did you know that if the government raised efficiency standards for cars just 1 MPG it would save 420,000 barrels of oil a day, or about twice the oil lost in the spill?

And that heat escaping through leaky windows wastes more oil than the Alaskan pipeline supplies in a year?

What it comes down to is this: As long as we are so dependent on fossil fuels and so wasteful of the oil we have, more offshore drilling and disastrous oil spills are inevitable.

But together we can curb our dependency on oil.

We can shelve Bush's plan to lease the continental shelf to offshore drillers. We can put pressure on Washington to tighten auto efficiency standards and restore the funding for renewable energy sources Reagan took away.

And we can convince U.S. automakers to stop pushing large cars and muscle cars, and get back to marketing more fuel efficient automobiles.

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Because it's time we put the brakes on our nation's oil dependency.

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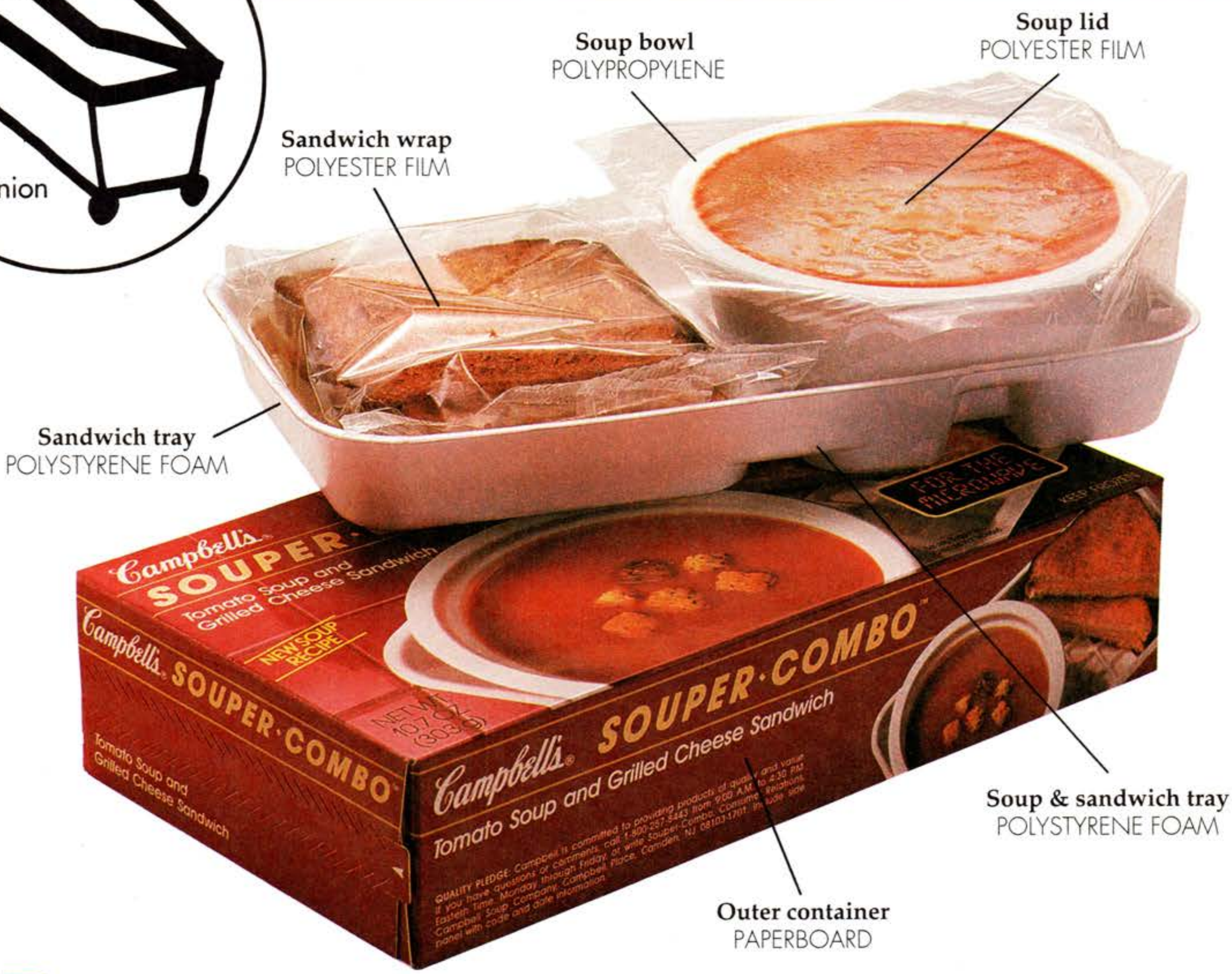

Photo by Donald Betts/Horizon Photographics, Inc.

Racing for an early lead in microwave food technology, the Campbell's Soup Company established a special unit in 1986 to explore new product possibilities. After months of research, Campbell's Microwave Task Force came up with the frozen microwavable soup and sandwich you see above.

Food-industry specialists and consumers alike apparently think the "Souper Combo" is the greatest thing since sliced bread. *Food Business Magazine* deemed it one of the five finest products of 1988 (along with J.R. Simplot's Micromagic Milkshake). *Food and Drug Packaging Magazine* awarded it "Package of the Year." And the product has done so well in its Midwest test market that it will be available nationwide in a matter of months.

The Souper Combo consists of 11.9 ounces of edible material . . . and six separate layers of packaging, five of them plastic. It's precisely the kind of product that's created the municipal landfill monster. Americans already toss 440 pounds of packaging per person per year into their garbage pails, and the amount of plastic packaging is expected to double in the next decade, thanks in part to its increased use for microwavable foods.

Do any of the folks who buy the Souper Combo think twice about throwing away a polypropylene soup bowl, two polystyrene trays, a polyester soupbowl lid, polyester sandwich wrap, and an outer container made of paperboard for the sake of a simple meal that takes seven minutes to heat and probably less time to eat? Not one, we'd venture to guess, would want a new landfill or incinerator in his or her backyard. Journalists have coined the term "NIMBY" — "Not In My Backyard" — for this mentality.

Campbell's, meanwhile, reaps the profits from the Souper Combo, leaving taxpayers with the tab for trash disposal. We've coined a term for this corporate mentality, which enables business executives to discount the social and environmental costs of their products: "NIMBLE" — "Not In My Bottom LinE."

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If you live in an area served by Waste Management, your community leaders may already be considering a Recycle America program. Your support can speed up the decision. Call Waste Management's Recycle America Hotline today at 312/218-1760.

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Men of the Civilian Conservation Corps, a program initiated during the Depression, break ground for the Curtis Prairie .

The young men above, whose picture was taken on a chilly November day in 1935, had no idea they were making environmental history. More likely they just considered themselves lucky to have work when drought and economic depression were devastating the Midwest. But the poorly managed cornfield they tilled in Madison, Wisconsin, was to become the Curtis Prairie (named after botanist John Curtis). To this day, the prairie is a model for ecosystem-restoration projects across the country.

By the 1930s, America's 7,000,000 acres of virgin prairie were all but extinct, due largely to agricultural development. When the prairie disappeared, so did the abundant vegetation that had regenerated soil and retained water, protecting the land from erosion.

The restoration began under the watchful eye of renowned conservationist Aldo Leopold. During the five-year tenure of a young prairie ecologist named Theodore Sperry, hired by Leopold in 1936, 42 native species were re-established. It was Sperry who discovered that fire, which had once swept regularly through the plains, is essential to the prairie's survival. Fire removes dead grass and kills trees, weeds, and other competitors without destroying roots and seeds beneath the topsoil. Since 1950, regularly scheduled man-managed fires have helped revive the Curtis Prairie.

Today the 60-acre restored tall-grass prairie, maintained by the University of Wisconsin Arboretum and a volunteer corps, boasts 300 to 400 plant species, most of them native. Control of exotics like leafy spurge continues to challenge ecologists and botanists.

—Ginia Bellafante

Gayfeather (liatris pycnostachya) and yellow cornflower are among the native wildflowers that have been re-established on the prairie.

Today, man-made fires help regenerate prairie life.